FOR THE TOWN OF

HAMPTON, NEW HAMPSHIRE

MASTER PLAN:
CHAPTER 6: NATURAL RESOURCES

2009 Supplement to 1995 Master Plan
This Natural Resources Chapter replaces the 1996 Supplemental Chapters:
Water Resources
Soils and Construction Materials
Open Space and Land Conservation

Prepared for the Hampton Planning Board

by the
Rockingham Planning Commission

Adopted October 7, 2009

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1.0 INTRODUCTION

1.1 Summary of Natural Resources of Hampton

Hampton lies within two of New Hampshire's major watersheds: 8,343 acres in the Coastal Watershed and 558 acres in the Great Bay Watershed. *Refer to Map 1-Base Map in Appendix G.*

Hampton has a high percentage of wetlands (37%) and undeveloped lands (61%) which includes water and agricultural lands, and unfragmented lands (40%). Undeveloped lands include 1,720 acres of forests (comprising 31 percent of the total acreage).

Hampton has a dense drainage network totaling 79 linear miles of both freshwater and tidal rivers, streams and brooks.

Table 1. Summary of natural resources in Hampton

Resource Type	Units	% total area
Aquifers	1,955 acres	22
Coastal Watershed	8,343 acres	94
Conserved Lands	603 acres	7
Core Focus Areas (The Land Conservation Plan for NH Coastal Watersheds)	2,814 acres	31
Great Bay Watershed	558 acres	6
Ponds	39 acres	0.4
Public Water Supply Wells	78,503 total population served	
Rivers/Streams (linear feet)	417,987 feet	79 miles
Undeveloped/Agricultural Lands/Water	5,520 acres	61
Unfragmented Lands	3,636 acres	40
Wetlands (National Wetlands Inventory)	3,393 acres	37
Exemplary Habitat Areas (NH Wildlife Action Plan)	3,102 acres	34
Total Area of Land = 8,832 acres; Total Area of Water = 256 acres; Total Area = 9,088 acres		

1.2 Population Growth and Land Use Change

Population Growth

The seacoast region in southeastern New Hampshire has experienced a 37 percent population increase during 1980 to 2000 (NH Office of Energy and Planning, 2001). Hampton has experienced a 42 percent increase (4,444 residents) in population from 1980 to 2008, and is projected to have an additional 22 percent increase (3,233 residents) by 2020.

As buildable lands become more scarce, it is important to consider the potential consequences when increased development pressures compete with natural resource protection. The town may consider updating a growth and planning study to evaluate build-out conditions under current

zoning, and alternative buildout scenarios that would provide necessary protection of important natural resources while accommodating project growth and associated development.

Table 2. Hampton population from 1980 and projected through 2020, and housing statistics

Total Population 2008	Total Area (sq.mi.)	Persons per square mile land	# Housing units	# Seasonal housing units	Population per housing unit
14,937	14.58	1,146	9,349	2,490	2.18

Population Statistics from 1980 and projected through 2020			
1980 Population	Change in Population 1980-2000	Projected Population 2020	Change in Population from 2000-2020
10,493	42%	18,170	22%

Land Use

Currently, the dominant land cover and land uses in Hampton include: wetlands (31.2%), residential development (26%), and forested lands (19%). The other land cover and land uses listed in Table 3 below comprise the remaining 24 percent of the total land area of Hampton.

It is important to note that the transportation and road network (including auxiliary and rail transportation) comprises 6.9 percent of the total land cover in Hampton. This is considerably higher than the regional coverage of 3 percent for transportation and road network uses.

Table 3. Summary of land use/land cover from 1962, 1974, 1998 and 2005

Land Use/Land Cover Description	1962		1974		1998		2005	
	Acres	% total area	Acres	% Total	Acres	% total area	Acres	% total area
Residential	1,171.1	13.1	1,458.2	16.4	2,139.9	24.0	2,354.6	26.0
Industrial/Commercial	110.5	1.2	171.7	1.9	422.4	4.7	367.4	4.1
Mixed Urban	256.7	2.9	262.7	2.9	179.5	2.0	0.3	0.0
Transportation/Roads	255.0	2.9	288.2	3.2	311.2	3.5	477.2	5.3
Rail Transportation	8.6	0.1	8.6	0.1	8.6	0.1	8.5	0.1
Auxiliary Transportation	58.4	0.7	69.1	0.8	129.2	1.4	136.5	1.5
Playing Fields	14.3	0.2	35.1	0.4	36.9	0.4	94.6	1.0
Active Agriculture	600.1	6.7	211.4	2.4	120.9	1.4	150.3	1.7
Farmsteads	8.7	0.1	5.8	0.1	0.0	0.0	5.0	0.1
Forested	3,604.2	40.4	3,509.7	39.4	2,987.9	33.5	1,720.2	19.0
Water	597.6	6.7	598.2	6.7	599.9	6.7	474.8	5.2
Wetlands	1,752.0	19.7	1,613.3	18.1	1,635.2	18.3	2,830.3	31.2
Idle/Other Open	476.2	5.3	681.2	7.6	341.7	3.8	433.1	4.9

Since 1974, Hampton has lost 1,790 acres or 51 percent of its forested lands. Based on the statistics reported in Table 4, this loss appears to coincide with increases in residential (897 acres), industrial and commercial (combined 196 acres) development, expansion of the associated transportation network (257 acres), and the loss of active agricultural lands.

Table 4. Change in land use (developed lands) and natural resources from 1962 to 2005

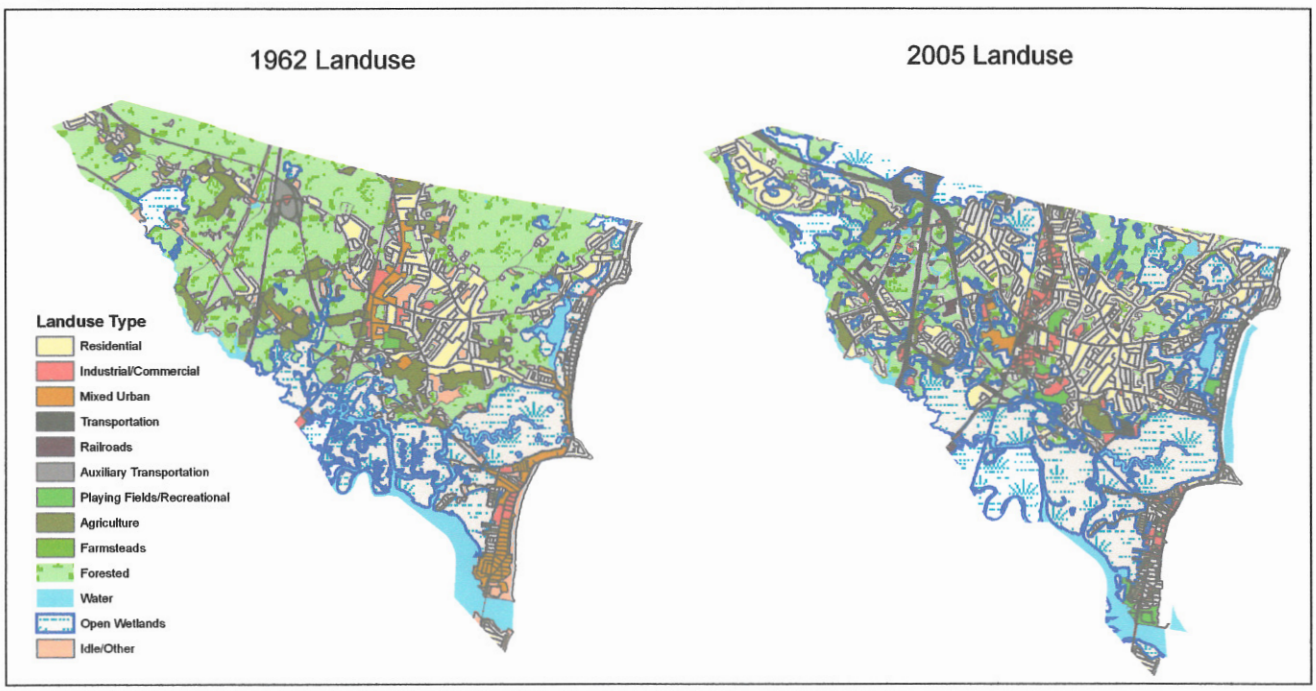
Land Use (acres)	1962 to 1974	1974 to 1998	1998 to 2005	Total Change
Active Agriculture	-388.7	-90.5	+29.4	-449.8
Forests	-94.5	-521.8	-1,267.7	-1,884.0
Idle/Other Open	+205.0	-339.5	+91.4	-43.1
Natural Resource Change				***-2,376.9***
Residential	+287.1	+681.7	+214.7	+1,183.5
Industrial/Commercial	+61.2	+250.7	-55.0	+256.9
Transportation/Roads/Rail	+43.9	+83.1	+173.2	+300.2
Developed Lands Change				***+1,740.6***

1.3 Significant Threats

Sprawl and Landscape Fragmentation

As shown in the Figure 1 below, residential and non-residential development has occurred from 1962 to 2005 throughout Hampton, particularly adjacent to the town center area and along the major transportation corridors including NH1, NH27 and the Hampton Beach area.

Figure 1. Land use and land cover from 1962 and 2005



Hampton has 40 percent unfragmented lands, however, 36.5 percent of these lands are comprised of wetlands and water bodies.

Unfragmented Lands Statistics

Unfragmented Lands	3,636 acres	40.0% total area of Hampton
Conserved Unfragmented Lands	837 acres	9.2 % of total area of Hampton

Impervious Surface Coverage and Water Quality

From 1990 to 2005, Hampton has seen a 6.5 percent increase in impervious surface coverage:[1]

1990 1,291 acres = 14.2%
2000 1,763 acres = 19.4%
2005 1,881 acres = 20.7%

Studies conducted in the northeast have documented that by converting as little as ten percent of a watershed to impervious surfaces, stream water quality, stream channel structures, and species habitat begins to deteriorate. Above 25 percent impervious surface, water quality can be seriously degraded (see Section 3.3 for information about impervious surface and water quality). The town may consider evaluating their development regulations to address impervious surface coverage by requiring site design standards and stormwater measures to mitigate any future potential effects to water quality.

Climate Change

The increasing trend of carbon dioxide concentrations in our atmosphere in recent decades has caused concern over its effect on environmental ecosystems and climate worldwide. Alterations to our climate in the northeast U.S. could result in changes or decline in certain sectors of the economy, and health costs associated with respiratory health and heat related illnesses.

Climate change and sea level rise are factors to consider in the long range planning for Hampton's natural resources. Climate change predictions for our area include increasing average temperatures and storm intensity. It has been confirmed and documented that sea level in the Gulf of Maine has risen over the past century, and future rise in sea level is predicted to continue. These phenomena of nature could result in changes in certain sectors of our local economy, including winter and summer tourism and agricultural production. Coastal real estate values may also be affected.

The current configuration and characteristics of the natural resources currently existing are also subject to change as a result of environmental influences. Potential changes include the types of trees and forest communities which will be viable in Hampton, as well as changes associated with higher ocean temperatures and increased migration of saltwater inland.

[1] Justice, David, Stream Buffer Characterization in Coastal NH, University of New Hampshire Complex Systems Research Center, 2007.

1.4 Master Plan Support and Consistency

Hampton Master Plan

The following previous chapters of the Hampton Master Plan supported protection and conservation of natural resources, as summarized below:

Chapter: Water Resources	▪ Protect the quantity of groundwater resources ▪ Encourage municipal and other water conservation measures ▪ Protect lands in aquifer and wellhead areas ▪ Require stormwater management on developed sites
Chapter: Open Space and Land Conservation	▪ Develop a comprehensive open space protection plan, including creation of an open space preservation committee, farmland preservation, public access to waterways, creation of non-motorized trails, increase parks and parkland, increase open space areas, preserve natural landscape features ▪ Implement land preservation techniques, including purchase of land and development rights, easements, donations, voluntary open space preservation

Hampton Beach Master Plan

The Vision of the Hampton Beach Master Plan specifically recognizes the value of natural resources and maintaining a healthy environment. Section D Environment and Open Space of the Hampton Beach Master Plan provides a detailed overview of the following natural resources of coastal area of Hampton including: Hampton Seabrook Marsh and Estuary; Regulation of Tidal Marsh Activity; Current Conditions and Issues/Analysis; and Air Quality.

1.5 Recommendations

INT 1 The town may consider undertaking a growth and planning study to evaluate build-out conditions under current zoning, and alternative build-out scenarios that would provide necessary protection of important natural resources while accommodating projected growth and associated development.

INT 2 The town may consider evaluating their development regulations to address impervious surface coverage by requiring site design standards and stormwater measures to mitigate any future potential effects to water quality.

2.0 NATURAL CONDITIONS AND LANDSCAPE

2.1 Physiography

Rockingham County is part of the major land resource area known as the New England and Eastern New York Upland, Southern Part. Elevation ranges from sea level to about 1,350 feet above sea level. The county includes the coastline of New Hampshire and extends inland to the Merrimack River Valley.

2.2 New England Climate

New England weather and climate are among the most varied in the world, including extremes of both hot and cold temperatures, droughts, heavy rainfall, hurricanes, tornadoes, blizzards, and other severe weather. These great variations in New England weather are influenced by many factors relating to the physical geographical setting, including the region's latitude and coastal orientation.

There are four important components that dominate New England climate. First, the area is located about halfway between the equator and the North Pole, receiving both warm-moist air from the south and cold-dry air from the north, often in rapid succession. Second, the region is dominated by a cold water current along its east coast (Maine, New Hampshire, and eastern Massachusetts) and a warm water current along the south shore (Connecticut, Rhode Island, and southern Massachusetts). The sea breeze circulation, particularly along New England's east coast, tends to regulate frequencies and intensities of thunderstorms in the coastal zone, while bringing relief of peak summer temperatures. In winter, coastal waters remain warm relative to land areas, influencing snow-rain boundaries, which are difficult for forecasters to predict. Third, since New England falls primarily in the zone of the westerly's, the area is dominated by drier continental airflow from various areas across North America, rather than having a prevailing flow from off of the Atlantic Ocean. Fourth, New England has mountainous topography which also influences weather patterns. Mountains can enhance precipitation on the windward side, and create drier conditions on the downwind slopes, known as the "rain shadow" effect.

As a result of New England's position relative to the polar front, its continental climate type, its coastal orientation, and the mountainous topography, the region's weather is notoriously variable seasonally.[2]

2.3 Geology

The geology of the Seacoast region consists of fractured metamorphic bedrock that is overlain by glacial materials deposited during the last glaciation, which ended between 12,000 and 5,000 years ago. Glacial stratified-drift aquifers (consisting of layers of sand, gravel, clay, and silt)

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[2] New Hampshire State Climate Office, University of New Hampshire Airmap website at http://airmap.unh.edu/background/ClimatePrimer.html

cover about 18 percent of the Seacoast region and 22 percent of Hampton. These deposits are generally more productive source of water than the local bedrock aquifer.

2.4 Soil Types and Conditions

Soil Types

Hampton soils are comprised predominantly of 4,972 acres of Hoosic-Canton-Chatfield soil (gravelly fine sandy loam), and 2,720 acres of Ipswich-Westbrook-Udipsamments soil (mucky peat). Coastal areas consist of Hollis-Canto-Chatfield soils in the north and Ipswich-Westbrook-Udipsamments soils in the south and throughout the Hampton salt marsh. Upland areas in the western areas of town consist of Hoosic-Canton-Chatfield soils. *Refer to Map 2-General Soils, and Soil Potential and Suitability for Development* in Appendix G.

Table 5. General soil types and acreages

General Soil Types	Acres	% total acres
Hollis-Canton-Chatfield	874	9.8
Hoosic-Canton-Chatfield	4,972	55.9
Ipswich-Westbrook-Udipsamments	2,722	30.8
Riverine uplands/salt marsh	334	3.8
Total Land Area = 8,902 acres		

Soil Conditions

Soil is a significant yet often overlooked natural resource. It forms the landscape upon which land use happens. Because soil is the foundation for all land uses, the condition of the soil is an important factor in all land use decisions. Current and accurate soil information provides the Planning Board with a tool with which to make informed decisions regarding land use and natural resource protection.

The Rockingham County Soil Survey was completed in 1994 by the U.S. Department of Agriculture Soil Conservation Service in cooperation with the New Hampshire Agricultural Experiment Station. Developed according to the National Cooperative Soil Survey standards by soils scientists, the soil survey identifies distinct properties and characteristics of different soil types, from which certain predictions are made about the suitability of a soil for different uses. The soil survey also includes a soils map showing the distribution of soil types.

Soil Drainage Class

One important characteristic of a soil is its drainage class. The soil drainage class relates to the ability of water to pass through the soil (soil permeability). Drainage class can indicate the presence or absence of wetlands and poorly drained soils, the ability of soil to infiltrate stormwater runoff, and the capacity of soil to filter pollutants. This information is invaluable to the Planning Board in evaluating development proposals and planning for growth in areas where soil conditions are appropriate for development.

Soil Development Potential

The Rockingham County Conservation District (RCCD) with the Soil Conservation Service developed *Soil Potentials for Development, Rockingham County* (May 1987), a system for rating soil based on its development potential. This approach classifies soils on the basis of the relative quality of a soil for development when compared with other soils in the County. Soil potential ratings take into consideration the capability or difficulty of developing dwellings, septic systems, roads and streets, and other development on a given soil type. Ratings include five categories – very high, high, medium, low and very low potential. The RCCD promotes the retention of important farmland soils and the protection of wetlands.

Hampton soils with the highest development potential are located predominantly in the uplands in the central areas north of the salt marsh and in the western areas of town, south of NH 101. Soil potential ratings and corresponding soil acreage is summarized in Table 6 below. *Refer to Map 2-General Soils, and Soil Potential and Suitability for Development.*

Table 6. Summary of soil potential ratings

Soils (potential)	Acres	% total area
Very High	473	5.6
High	1,125	13.3
Medium	2,136	25.2
Low	239	2.8
Very Low	3,188	37.6
No Rating	1,317	15.5

The soil development potential by category in Hampton is described below:

473 acres are classified as having a *very high development potential*, meaning soil performance is at or above local standards.

1,125 acres are classified as having *high development potential*, meaning soil performance is at or above local standards. The cost associated with overcoming development limitations are low due to favorable soils conditions.

2,136 acres are classified as having a *medium development potential*, meaning that soil limitations add significantly to the cost of development.

239 acres are classified as having a *low development potential*, meaning that soil limitations are costly to overcome.

3,188 acres are classified as having a *very low development potential*, meaning that wet soils or severe slopes cause development to be economically unfeasible.

The remaining 1,317 acres (15.5 percent) of Hampton's land area is considered to be non-classified due to alterations of natural soil conditions. This land includes gravel pits, urban development, roads and the municipal landfill.

The soil potential rating system can provide important information for determining the location and density of development whether it is served by municipal water and sewer services or not. Because Hampton has extensive municipal water and sewer systems, the value of the soil potential rating system is limited in these areas to mostly stormwater management, basement design, and road and driveway construction. As areas with highest development potential are developed, there will be a greater focus on developing the less desirable lands, including those areas without municipal water and sewer services.

With growth and increases in impervious surfaces and stormwater volume, the ability of soil to infiltrate runoff will become an important consideration in protecting public and environmental interests including: maintaining capacity of the municipal drainage infrastructure, recharging groundwater and protecting the quality of surface waters. In order to protect these interests, the town may consider revisions to land use ordinances and regulations to address development on lands with limited potential and those areas not served by municipal water and sewer services.

2.5 Agricultural Soils

In 1908, Hampton had 142 local farms; today, that number has dwindled to only two working farms. Once considered to be a farming community, agriculture declined in Hampton as economics and land values compromised the viability of the small farm throughout the Seacoast region. Farmers have sold their land for development or stopped farming and allowed their fields to grow wild again. Since 1962, Hampton has lost approximately 450 acres of active agricultural lands.

Relatively few open fields remain today in Hampton, consisting largely of 150 acres of active agricultural lands, 5.0 acres of farmsteads, and 433 acres of idle/open lands.

Table 7. Summary of farmland types and changes in acreage from 1962 to 2005

	Statistics Reported in Acres			
Year	**1962**	**1974**	**1998**	**2005**
Active Agriculture	600.1	211.4	120.9	150.3
Farmsteads	8.7	5.8	0.0	5.0
Idle/Other Open	476.2	681.2	341.7	433.1
Land Use	**1962 to 1974**	**1974 to 1998**	**1998 to 2005**	**Total Change**
Active Agriculture	-388.7	-90.5	+29.4	-449.8
Idle/Other Open	+205.0	-339.5	+91.4	-43.1

Farmland Soils

In NH, agricultural soils are identified in three categories: Prime Farmland Soils, Farmland Soils of Statewide Importance, and Farmland Soils of Local Importance. Hampton has 539 acres of Prime Farmland soils, 1,294 acres of Farmland Soils of Statewide Importance, and 1,087 acres of Farmland Soils of Local Importance. Farmland soils in Hampton comprise 2.3 percent of the

total acres of farmland soils in Rockingham County. The farmland soil types are summarized in the table below and a list of farmland soil map units are provided in Appendix B and Map 3-Agricultural Soils in Appendix G.

Table 8. Farmland soil types in Hampton and Rockingham County

Farmland Soil Type	Acres in Hampton	% total land area of Hampton	Acres in Rockingham County
Prime Farmland Soils	539	6	36,347
Farmland Soils of Statewide Importance	1,294	15	38,767
Farmland Soils of Local Importance	1,087	12	51,658
Total	***2,919***	***33***	***126,772***

Total Area of Land = 8,832 acres

Prime farmland soils and Farm Soils of Statewide Importance are predominantly located in the uplands in the central area of town north of the salt marsh, and in the western areas of town. Most of the Farm Soils of Statewide Importance appear to be located on heavily developed lands in the central uplands between NH 1 and Hampton Beach, with several isolated tracts along Drakeside Road and off Old Stage Road. Large tracts of Farmland of Local Importance are located in the western areas of town along NH 101 and west of Timber Swamp Road. *Refer to Map 3-Agricultural Soils in Appendix G.*

Prime Farmland Soils

Prime Farmland is land which has the best combination of physical and chemical characteristics for the production of crops. It has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops when treated and managed, including water management, according to current farming methods. Prime Farmland must have been used for the production of irrigated crops at some time during the two update cycles prior to the mapping date. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use. Prime Farmland must meet all the following criteria: water, soil temperature range, acid-alkali balance, water table, soil sodium content, flooding, erodibility, permeability, rock fragment content, and rooting depth.[3]

Farmland Soils of Statewide Importance

Farmland of Statewide Importance is land other than Prime Farmland which has a good combination of physical and chemical characteristics for the production of crops. It must have been used for the production of irrigated crops at some time during the two update cycles prior to the mapping date. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use. Farmland of Statewide Importance must meet all the following criteria: water, soil temperature range, acid-alkali balance, water table, soil sodium content, flooding, erodibility, and rock fragment content.[4]

[3] USDA-Soil Conservation Service, Land Inventory and Monitoring (LIM) System
[4] Ibid

Farmland Soils of Local Importance
Farmland of Local Importance is either currently producing crops, has the capability of production, or is used for the production of confined livestock. Farmland of Local Importance is land other than Prime Farmland or Farmland of Statewide Importance. This land may be important to the local economy due to its productivity or value. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use.[5]

2.6 Recommendations

NL 1 Evaluate land use ordinances and regulations to address development on lands with limited potential and those areas not served by municipal water and sewer services.

NL 2 Evaluate ordinances and regulations to determine the level of protection and/or conservation of important farmland soils, and revise if current requirements are not adequate to meet the town's goals for protection of the resource.

[5] USDA-Soil Conservation Service, Land Inventory and Monitoring (LIM) System

3.0 SURFACE WATER RESOURCES

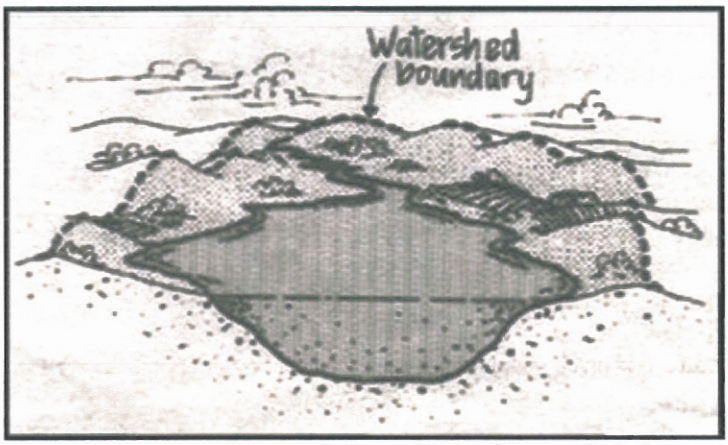
Surface waters are important because they provide flood retention and groundwater recharge functions, and ecological, scenic and recreational value to the community as a whole. Hampton contains approximately 830 acres of surface water area or 9.1 percent of the total area of the town. The majority of surface water area is salt marsh and tidal waters. *Refer to Map 4-Surface Water Resources in Appendix G.*

3.1 Watersheds

What is a Watershed?

A watershed is the area of land that drains to a particular surface water body. "Watershed" is synonymous with other terms you may have heard such as "drainage basin" and "catchment area." All precipitation that falls within a watershed, but is not used by existing vegetation, will ultimately seek the lowest points. These low points are bodies of water such as rivers, lakes, and finally the ocean. The network formed by streams, rivers, lakes and ponds forms the surface drainage system of the watershed. Topography defines the boundary of a watershed. The boundary of a watershed is defined by the highest elevations surrounding the land area containing the drainage system.

Figure 2. Geography of a watershed



[Source: Lamprey River Advisory Committee website]

Regional and Local Watersheds

Hampton is located within two regional watersheds – the Coastal watershed and the Great Bay watershed. The watershed boundaries depicted on Map 4-Surface Water Resources show that only a small portion of the northwest part of Hampton is located within the Great Bay watershed. The Coastal watershed includes the remaining areas of town and consists of four local subwatersheds. The characteristics of these subwatersheds are described below.

Taylor River/Hampton River Subwatershed. The largest of the subwatersheds, the Taylor River/Hampton River subwatershed contains seven named perennial watercourses: Drakes River, Landing Brook, Nudd's Canal, Blind Creek, Tide Mill Creek, Eel Ditch, and Nilus Brook. The subwatershed contains four surface water bodies: Batchelders or Coffin Pond, Lamprey Pond, Mill Pond, and Meadow Pond. The subwatershed extends into portions of Exeter, Kensington, and Hampton Falls.

Old RiverSubwatershed. The Old River subwatershed contains two perennial watercourses, Ash Brook and Old River, and one surface water body, Car Barn Pond. The subwatershed extends into portions of Exeter and North Hampton.

Little River Subwatershed. The Little River subwatershed contains two unnamed perennial watercourses, one a branch of the Little River and one a tributary of Garland Brook in North Hampton, and six very small surface water bodies that are part of the Little River Swamp. Located in the northeast corner of Hampton, the majority of the subwatershed extends into North Hampton and Rye.

Winnicut River Subwatershed. Located in the northwest corner of Hampton, the Winnicut River subwatershed is part of the Great Bay watershed. The subwatershed contains the Line Swamp, which is the origin of the Winnicut River and several of its tributaries. The subwatershed extends into portions of Stratham, Exeter, North Hampton, and Greenland.

3.2 Surface Waters

Surficial Hydrology

Surface water systems are any type of standing or flowing body of water above the ground, including streams, rivers, ponds, lakes and freshwater and tidal wetlands. Surface water systems are dynamic, subject to seasonal climatic variability that produces a range of hydrologic conditions. Because surface waters collect runoff from adjacent land areas, they are highly susceptible to pollution from both point and nonpoint sources.

The hydrology of surface water systems can be highly disrupted as a result of development on the landscape and throughout a watershed. Impervious surfaces, diversion of runoff through stormwater management systems, and reduced infiltration all contribute to the alteration of the natural hydrologic regime that sustains surface water systems. These changes to the surficial hydrology affect the volume and rate at which water moves through the system and, in the extreme case, removes water from the system through interbasin transfer (the diversion of water from one watershed to another).

Rivers and Streams

As reported in Table 9 below, Hampton has 79.2 miles of rivers, streams and brooks, of which 54.2 miles are comprised of unnamed tributaries.

Table 9. Summary of rivers, streams and brooks and corresponding miles

Rivers, Streams, and Brooks	linear feet	miles
Ash Brook	7,361	1.4
Atlantic Ocean	25,544	4.8
Blackwater River	680	0.129
Browns River	1,057	0.200
Clay Brook	24	0.005
Drakes River	13,182	2.5
Hampton Falls River	1,812	0.343
Hampton River	9,036	1.7
Landing Brook	2,170	0.411
Little River	233	0.044
Nilus Brook	7,809	1.5
Old River	16,205	3.1
Taylor River	22,255	4.2
Tide Mill Creek	18,763	3.6
Winnicut River	5,865	1.1
Unnamed Tributaties (combined)	285,995	54.2
Total	***417,987***	***79.2***

Of these rivers, streams and brooks, over 67 percent or 53.3 miles are first order streams, and 83 percent or 66 miles are second order or lower.

Table 10. Summary of miles of rivers, streams and brooks by stream order

Stream Order	Linear feet	miles	% total miles
First Order	281,261	53.3	67.3
Second Order	66,645	12.6	16.0
Third Order	12,148	2.3	3.0
Fourth Order	3,0542	5.8	7.3
Fifth Order	1,847	0.35	0.4
Undetermined	25,544	4.8	6.0
Total	***417,987***	***79.2***	--

Stream Buffers

The study *Stream Buffer Characterization in Coastal NH* by the University of New Hampshire Complex Systems Research Center (Justice, 2007) evaluated the condition of 150 foot and 100 foot buffers to rivers and streams in Hampton. The data from this study is summarized below.

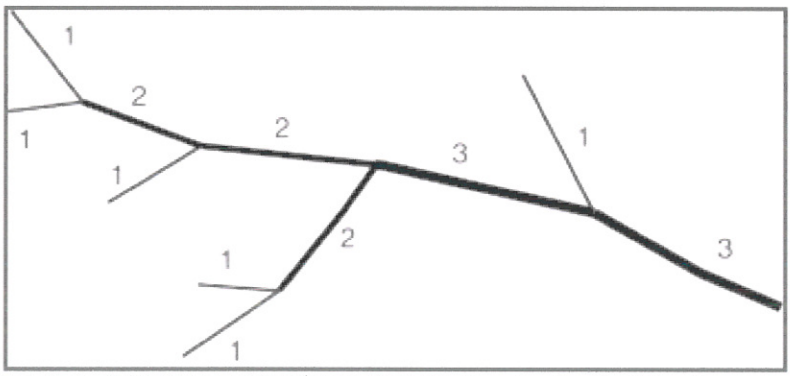
Table 11. Condition of 150 foot and 300 foot buffers to rivers and streams in Hampton

Buffer Width	Buffer (acres)	% intact	% mostly intact	% somewhat intact	% altered
150 foot buffer	966	9.8	0.7	0.7	0.4
300 foot buffer	2,242	21.7	2.4	1.5	1.5

First Order Streams

First order or headwater streams are located in the uppermost parts of a watershed, where overland flow and runoff first become concentrated in an organized and defined channel. Knowledge of influence of headwater streams on the water quality and flow conditions of downstream waters is essential to water resource management. Studies have demonstrated the intrinsic connections of headwater areas to landscape processes and downstream water quality through their influence on the supply, transport, and fate of water and the chemical makeup of water in watersheds. Other studies demonstrate the profound influence that headwater areas have on shaping downstream water quantity and water quality [6]. These results have relevance to water-resource management and regulatory decisions with respect to protecting headwater streams from degradation and the potentially negative impacts of development within sensitive riparian areas and within the watershed.

Figure 3. Strahler Stream Order System



[Source: U.S. Corps of Engineer diagram showing the Strahler stream order system]

Ponds

The significant freshwater bodies are Mill Pond, Car Barn Pond, Batchelder (Coffin) Pond, and Lamprey Pond. Because of their shallow depths, none of these ponds are used to any great extent for recreational purposes, except for ice skating in the winter. Residents and visitors use Batchelder Pond and Lamprey Pond for fishing. Batchelder Pond is stocked with trout by the NH Fish and Game Department, and a fisheries survey was conducted on lamprey Pond by NH Fish and Game biologists in 2008 for the Conservation Commission.

NH Comprehensive Shoreland Protection Act

The NH DES Shoreland Program implements RSA 483-B, the Comprehensive Shoreland Protection Act (CSPA). The CSPA establishes minimum standards for activities within the Protected Shoreland – land within 250 feet of the state's larger water bodies - that are designed to protect the water quality and to fulfill the state's role as trustee of those waters. Effective

[6] Alexander, Richard B., Boyer, Elizabeth W., Smith, Richard A., Schwarz, Gregory E., Moore, Richard, B. *The Role of Headwater Streams In Downstream Water Quality*, Journal of the American Water Resources Association (2007, Vol.43, N.1,pp.41-59)

July 1, 2008, the state legislature amended the CSPA to revise existing and include additional standards to protect water quality. These standards include new requirements for clearing trees and other vegetation within the Woodland and Waterfront Buffer, limitations on impervious surface coverage, restrictions on the use of fertilizer and pesticides, and setbacks for primary structures. For more information, refer to the NHDES Shoreland Program website at http://des.nh.gov/organization/divisions/water/wetlands/cspa/index.htm.

Hampton has two rivers – the Hampton River (1.7 miles) and Taylor Rivers (4.2 miles) – and six ponds under the jurisdiction of the NH CSPA. *Refer to Map 5-Comprehensive Shoreland Protection Act in Appendix G.*

Table 12. Fourth order and higher river and public waterbodies under jurisdiction of the NH Comprehensive Shoreland Protection Act

Fourth Order and Higher Rivers			
Hampton River	At the juncture of Taylor River		
Taylor River	At the juncture of Ash Brook		
Public Waterbody	***Type***	***Comment***	***Areas (acres)***
Car Barn Pond	--	--	--
Batchelder (Coffin) Pond	--	--	--
Meadow Pond	--	--	47.5
Old Mill Pond	--	Dam in ruins	9.0
Taylor River Pond (dam)	Impoundment of 10 acres or more	--	45.0
Taylor River Pond	Impoundment of 10 acres or more	Coffins Mill	10.0

[Source: NH DES One-Stop Database, 2009]

3.3 Water Quality

Surface Water Quality Assessments

The NH DES Surface Water Quality Assessment Program produces two surface water quality documents every two years, the "305(b) Report" and the "303(d) List". As the two documents use the same data, the 305(b) Report and 303(d) List were combined into one Integrated Report starting in 2002. The Integrated Report describes the quality of New Hampshire's surface waters and an analysis of the extent to which all such waters provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities in and on the water. Results of the 2008 305(b) report (after section 305(b) of the Clean Water Act) for the Hampton segments of the Taylor-Hampton River and Hampton Harbor are summarized below.

Designated Uses
All surface waters of the State are either classified as Class A or B, with the majority of waters being Class B. NH DES maintains a list that includes a narrative description of all the legislative

classified waters. Designated uses represent the uses that a waterbody should support. Below are the Classification Designated Uses for Class A and Class B waters as described in RSA 485A:8.

Class A These are generally of the highest quality and are considered potentially usable for water supply after adequate treatment. Discharge of sewage or wastes is prohibited to waters of this classification.

Class B Of the second highest quality, these waters are considered acceptable for fishing, swimming and other recreational purposes, and, after adequate treatment, for use as water supplies.

Criteria. The second major component of the water quality standards is the "criteria". Criteria are designed to protect the designated uses of all surface waters and may be expressed in either numeric or narrative form. A waterbody that meets the criteria for its assigned classification is considered to meet its intended use. Water quality criteria for each classification may be found in RSA 485A:8, IV and in the State's surface water quality regulations (NHDES, 1999).

Antidegradation. The third component of water quality standards is antidegradation which are provisions designed to preserve and protect the existing beneficial uses and to minimize degradation of the State's surface waters. Antidegradation regulations are included in Part Env Ws 1708 of the State's surface water quality regulations (NHDES, 1999). The NHDES is currently developing specific antidegradation standards for water quality, which may be released in 2010. According to Env Ws 1708.03, antidegradation applies to the following:

- any proposed new or increased activity, including point and nonpoint source discharges of pollutants that would lower water quality or affect the existing or designated uses;
- a proposed increase in loadings to a waterbody when the proposal is associated with existing activities;
- an increase in flow alteration over an existing alteration; and
- all hydrologic modifications, such as dam construction and water withdrawals.

Table 13. Summary of Surface water Quality 305(b) Assessment Report (2008) for Hampton's surface waters. [Note: Status of Designated Uses are reported by river segments.] The Taylor-Hampton River and Hampton Harbor are Class B waters.

Watershed	Designated Uses			
	Aquatic Life	Swimming	Boating	Fish Consumption
Taylor River - Hampton River	Segments: 3 of 27 Likely Good	No Data	No Data	Segments: 4 of 27 TMDL needed; 23 of 27 TMDL completed
Hampton Harbor	Segments: 14 of 44 Likely Good; 2 of 44 TMDL needed; 3 of 44 Likely Bad to Severe	Segments: 10 of 28 Good; 4 of 44 TMDL needed	Segments: 12 of 44 Good-Marginal; 4 TMDL needed	Segments: 7 of 44 TMDL completed; 21 of 44 TMDL needed

TMDL = Total Maximum Daily Load [Source: NHDES One-Stop Data Center]

Impaired Waters
As reported in the 303(d) component of the NHDES Integrated Report, Hampton Seabrook Harbor is listed as an impaired water under the Clean Water Act standards. The impairment is due to the presence of Enterococcus (a bacteria normally found in the feces of people and many animals that can cause life-threatening infections in humans) from an unknown source. This impairment is a category "5P", a serious impairment which requires development of a Total Maximum Daily Load (TMDL).

Effects of Development on Surface Water Quality

Nonpoint Source Pollution
Non-point source pollution is collected in surface runoff when rainfall, snowmelt, or irrigation flows over land or through the ground, mobilizes pollutants, and deposits them into rivers, lakes, and wetlands or introduces them into groundwater. These pollutants can include oil, salt and sand from roadways, agricultural chemicals from farmland, sediments from construction sites, crop lands, and eroding streambanks, and nutrients and toxic materials from urban and suburban areas. The impacts of nonpoint source pollutants on surface water and groundwater vary temporally and spatially. However, it is well documented in scientific literature that nonpoint source pollutants at certain concentrations can have harmful effects on human health, drinking water supplies, recreation, fisheries, and wildlife.

Reduction and prevention of nonpoint source pollution requires a collective effort at the federal, state and local levels. Some activities are federal responsibilities, such as ensuring that federal lands are properly managed to reduce soil erosion and that water quality standards for Waters of the U.S. are protected through the Phase II Non-point Discharge Elimination System (NPDES) permitting program. Some activities are state responsibilities, including developing: legislation to protect surface waters and wetlands; permit requirements for large developments; and standards groundwater and public drinking water supplies. Other activities are best addressed locally, by zoning or erosion control and stormwater management ordinances, and resource protection requirements. And each individual - homeowner, business owner, property owner, resource user, and visitor - can play an important role in minimizing non-point source pollution by practicing conservation and stewardship, and by complying with federal, state and local regulations to protect resources.[7]

Stormwater

Stormwater is generated by precipitation, surface runoff and snow melt from air, land, pavements, building rooftops and other impervious surfaces. Pollutants commonly found in stormwater can degrade water quality for public drinking water supplies and for aquatic habitat. Stormwater runoff is also discharged to surface water bodies through overland flow and infiltration to the groundwater table, and as direct discharge to streams, rivers, lakes and ponds, and wetlands. Direct discharge points for stormwater runoff consist of water treatment plants, detention basins, infiltration areas or basins, drainage ditches, and swales.

[7] New Hampshire Department of Environmental Services, Water Management Bureau

Impervious Surface Coverage
Studies conducted in the northeast have documented that by converting as little as ten percent of a watershed to impervious surfaces, stream water quality, stream channel structures, and species habitat begins to deteriorate. Above 25 percent impervious surface, water quality is seriously degraded. The 2005 report *The Effects of Urbanization on Stream Quality at Selected Sites in the Seacoast Region in New Hampshire, 2001-03*[8] found sites with between 8 and 14 percent impervious surface in the watershed generally showed changes in stream quality as measured by reductions in the combined water quality, habitat condition and biological condition score for these sites. The Center for Watershed Protection (Ellicott City, Maryland) reports similar findings of the correlation of percent impervious surface coverage with degradation of water quality and in-stream habitat.

Table 14. Impervious surface cover and population for Hampton, 1990-2005

Year	1990	2000	2005
Impervious Surface Cover (acres)	1,288.4	1,760.2	1,878.1
% Total Town Area	14.2	19.4	20.7

[Source: *Impervious Surface Mapping in Coastal New Hampshire* (2006) by David Justice and Fay Rubin, Complex Systems Research Center at the University of New Hampshire

Currently, Hampton has 20.7 percent or 1,881 acres of impervious surface coverage. As referenced above, the town is approaching the critical threshold of 25 percent for impervious surface coverage with respect to maintaining water quality of rivers, streams and other surface waters.[9]

3.4 Floodplains and Flood Hazard Areas

Floodplains

As reported in Table 14 below, Hampton has 3,416 acres of land within the 100-year floodplain, including 3,162 acres of riverine floodplain and 254 acres within coastal areas. 5517 acres of upland are located between the 100-year floodplain (Zone X) and 500-year floodplain, and 128 acres are within the 500 year floodplain (Zone X500).

Floodplain Ordinance
Article II, Section 2.4 Special Flood Area provides protection of floodplains and flood hazard areas. The Special Flood Area includes all lands designated as special flood hazard areas by the Federal Emergency Management Agency (FEMA) in its "Flood Insurance Study for the County of Rockingham, NH" dated May 17, 2005 or as amended, together with the associated Flood

[8] Deacon, Jeffrey, R., Soule, Sally A., and Smith, Thor E., *Effects of Urbanization on Stream Quality at Selected Sites in the Seacoast Region in New Hampshire, 2001-03*, U.S. Geological Survey Scientific Investigations Report 2005-5103.

[9] Justice, David, Stream Buffer Characterization in Coastal NH, University of New Hampshire Complex Systems Research Center, 2007.

Insurance Rate Maps dated May 17, 2005 or as amended. The following activities are prohibited with the Special Flood Hazard Area:

- the placement of manufactured homes is prohibited within except in existing manufactured home parks; and
- any development of encroachment (including fill) which would result in any increase in flood levels during the base flood discharge.

Variances may be issued within the Special Flood Area for:

1. the reconstruction, rehabilitation or restoration of structures listed on the National Register of Historic Places or the State Inventory of Historic Places, without regard to the procedures set forth in the remainder of this section; and
2. new construction and substantial improvements and for other development necessary for the conduct of a functionally dependent use provided that:
   - the structure or other development is protected by methods that minimize flood; and
   - there are no damages during the base flood and create no additional threats to public safety.

Variances may not be issued within any designated floodway if any increase in flood levels during the base flood discharge would result.

Flood Hazard Areas

In Hampton, the primary flood hazard areas are within the 100 year floodplain and areas affected by wave action in immediate coastal areas, as identified on the 1986 Flood Insurance Rate Map (FIRM). Many homes and businesses are located in flood prone areas. Development in flood prone areas is problematic as it:

- risks damage to life and property;
- reduces flood storage capacity of the floodplain, thus intensifying flood conditions elsewhere; and
- contributes to water quality problems.

These problems can be controlled or alleviated through the adoption of floodplain regulations as part of the National Flood Insurance Program. Hampton has adopted such regulations in Section 2.4 Special Flood Hazard Area of the zoning ordinance, which require any development to meet strict federal building codes specific to construction in flood hazard areas. These regulations discourage unsound development in the flood hazard areas by protecting the functions of the 100-year floodplain.

Table 15. Flood hazard zones identified on the FEMA Flood Insurance Rate Maps (FIRMs) for Hampton

Description of Flood Hazard Zone	Flood Hazard Zone	Acres
Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.	Zone A	569.4
Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. In most instances, base flood	Zone AE	2,523.3

elevations derived from detailed analyses are shown at selected intervals within these zones.		
River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.	Zone AO	69.4
Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.	Zone VE	254.2
Total Acres		***3,416.3***
Areas outside the 1-percent annual chance floodplain, areas of 1% annual chance sheet flow flooding where average depths are less than 1 foot, areas of 1% annual chance stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 1% annual chance flood by levees. No Base Flood Elevations or depths are shown within this zone. Insurance purchase is not required in this zone.	Zone X	5,517.1
Areas within the 500-year Floodplain, or areas within the 2-percent chance of flooding each year. Insurance purchase is not required in this zone.	Zone X500	128.4
Total Acres		***5,645.5***

Hampton Master Plan

The Hampton Master Plan Chapter 7 Natural Hazards provides information about floodplain and flood hazard areas. The Chapter defines specific objectives for development of hazard mitigation projects. The Natural Resource Protection objective states "actions that, in addition to minimizing hazard loss, also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation."

Mitigation projects identified for natural resource protection include:

Project	Action	Priority
Aquifer Recharge	Stormwater and wastewater effluent - reuse, infiltration and groundwater injection	High
Invasive Species Removal	Reduction and removal of Phragmites populations as part of salt marsh restoration	Medium
Erosion and Sedimentation	Stabilize channel at the Eel Creek North and South of Winncunnet Road crossing	Medium
Open Space Preservation	None identified	Low
Salt Marsh Pollution	Minimize residential dumping in the salt marshes through public outreach and programs including enhanced leaf and yard waste collection, spring clean-up, and hazardous waste collection	Low

3.5 Storm Water Management

Local Regulations and Initiatives

The Town of Hampton is an MS4 community as defined by the EPA Stormwater Phase II Final Rule, which applies to communities of regulated small municipal separate storm sewer systems (MSs). MS4 communities are identified as having urbanized areas comprising one or more places or central places - including the adjacent densely settled surrounding area or urban fringe – that together have a residential population of at least 50,000 and an overall population density of at least 1,000 people per square mile. Urbanized areas are a calculation used by the Bureau of Census to determine the geographic boundaries of the most heavily developed and dense urban areas.

Aquifer Protection District Ordinance
Section 2.5 Aquifer Protection District Ordinance of the zoning ordinance requires standards for certain uses and activities that also protect the quality and help maintain the quantity and natural hydrology of surface waters including limitations on maximum lot impervious coverage, site drainage and infiltration of runoff, use of deicing chemicals and prohibited high risk uses.

Master Drainage Plan
Hampton's Master Drainage Plan has not been updated since it was developed in 1986. As recommended in the existing plan, the funding necessary to complete the drainage system improvements for the entire town would be cost prohibitive. The town has identified updating the plan as a priority action and any improvements to the drainage infrastructure, excluding emergency repairs, have been placed on hold until the plan update is completed. In the meantime, the town adopted an aquifer protection ordinance that reduces overall input of stormwater to the municipal system by requiring retention and infiltration of runoff on developed sites. In 2008, a warrant article brought forward by the Town Manager to allocate funds for updating the plan failed.

Training and Outreach
In March 2009, staff from the University of New Hampshire Stormwater Center, in collaboration with the town of Hampton, NH Natural Resource Outreach Coalition (NROC) and Piscataqua Region Estuaries Project (PREP, formerly NHEP), presented an informational session about stormwater management for Hampton officials, staff and concerned citizens. This session covered up-to-date information about stormwater concerns for the town of Hampton, the benefits of improving stormwater management, latest technologies and practices, new state and local regulations, and managing municipal stormwater costs.

3.6 Recommendations

SW 1 Develop a Water Resources Management and Protection Plan per RSA 4-C:22.

SW2 The town should consider the quantity of water available to meet existing and projected demand when considering growth management options.

SW 3 When possible, the town should take a watershed approach to protecting water resources and managing stormwater and other drainage issues.

SW 4 The town should participate in and encourage regional coordination in addressing water supply needs and water resource management.

SW 5 The town should consider adopting building codes or regulations requiring installation of water efficient fixtures for new construction, and encourage selection of water efficient appliances.

SW 6 The town should implement water conservation measures including but not limited to conservation programs, public outreach campaigns, a comprehensive water usage and loss budget, and a leak detection program.

SW 7 The town should conduct a municipal water use audit and implement methods to reduce municipal water consumption.

SW 8 Evaluate the Stormwater Master Plan considering the following: consistency with existing land use and development regulations; current function of the existing drainage infrastructure; and identification of future improvements based on existing conditions as well as growth and build-out projections, and incorporating innovative best management practices and site design methods for new development and redevelopment.

4.0 WETLANDS

Hampton boasts a long and colorful history of farming, fishing and industry on the plains and along the canals of the Hampton Salt Marsh Complex. Traditionally, this wetland complex produced vast quantities of salt marsh hay, composed of *Spartina* alterniflora and *Spartina* patens, which was raked atop staddles (a circular arrangement of wooden poles driven into the marsh) into dome-like stacks on the marsh left to dry or "cure", then removed in the winter with sleds and transported to markets by marsh gundalow.

Figures 4. Boating through the saltmarsh

Figure 5. Hay stacks on the salt marsh

4.1 Functions and Values of Wetlands

RSA 482-A:2 defines a wetland as an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wetlands are valuable resources and worthy of protection from degradation or inappropriate uses. Wetlands provide critical ecological and socially valuable functions including:

- Flood water and stormwater storage areas;
- Removal and storage of silt and other sediments;
- Removal and uptake of nutrients and pollutants from surface waters; and
- Habitat and reproductive areas for plants, fish and wildlife.

Hampton has significant areas of freshwater, tidally influenced and tidal wetlands. Tidal wetlands or saltwater marshes are subject to daily tidal flooding of sea water. Tidally influenced wetlands are also subject to daily tidal cycles but contain brackish or fresh water.

As reported in Table 15 below, wetlands occupy 37.3 percent of the total area of Hampton. Most wetlands are situated adjacent to the complex river system in the southern portion of town and behind the barrier beaches. *Refer to Map4-Surface Water Resources in Appendix G.*

Table 16. Summary of wetland by type from the National Wetlands Inventory (NWI)

Wetland Type	Acres	% total area
Emergent	99	1.1
Estuarine*	2,023	22.3
Forested	798	8.8
Lacustrine	26	0.29
Marine*	218	2.4
Palustrine-Unconsolidated	39	0.43
Scrub-Shrub	190	2.1
Total	***3,393***	***37.3***

* Estuarine and Marine wetlands are tidal/saltwater or tidally influenced wetlands.

4.2 Freshwater Wetlands

Freshwater wetlands cover 1,152 acres of land or 13 percent of the total land area of Hampton. Freshwater wetlands are located in the interior areas of town adjacent to the Hampton and Taylor River and their tributaries or as isolated wetlands in upland areas.

Freshwater wetland types include: emergent (standing water, wet meadow), forested (dominant vegetation, lacustrine (lake environments), palustrine (swamps, marshes, potholes, bogs, or fens) and scrub-shrub (dominant vegetation).

4.3 Tidal Wetlands

Tidal marshes cover 2,241 acres or nearly 25 percent of total land area of Hampton. Tidal and tidally influenced wetlands are located in the Hampton River drainage and the lower portions of its tributaries and in coastal areas.

Tidal or saltwater wetland types include: estuarine (vegetated and non-vegetated brackish and saltwater marsh, shrubs, beach, bar, shoal or flat) and marine (deep water, open water estuary, bay, sound, open ocean).

4.4 Prime Wetlands

Prime wetlands were identified in the study *Prime Wetland Inventory Report Town-Wide Inventory Phase II, Hampton and Hampton Falls, NH* (2006) by Gove Environmental Services. These wetlands were evaluated using the Method for Comparative Evaluation of Nontidal Wetlands in New Hampshire (1991, the NH Method). The fourteen functions and values outlined in the NH Method were evaluated for the seven candidate wetlands in Hampton, including: Ecological integrity, wetland wildlife habitat, finish habitat, education potential, visual/aesthetic

quality, water-based recreation, flood control potential, groundwater use potential, sediment trapping, nutrient attenuation, shoreline anchoring and dissipation of erosive forces, urban quality of life, historical site potential, and noteworthiness.

The 2006 Gove study evaluated 2,887.6 acres of wetlands as candidates for prime wetland designation. These wetlands comprise 85.1 percent of the total wetland acreage and nearly 31.8 percent of the total land area of town. The study recommended the following wetlands for prime designation: Hampton Salt Marsh Complex, Little River Complex, Meadow Pond Complex, and Taylor River Complex (east). These wetlands comprise 2,307.6 acres or 80 percent of the wetlands evaluated in the study.

Currently, only the Hampton Salt Marsh Complex has been designated a prime wetland in Hampton.

Table 17. Wetlands evaluated as part of the 2006 Gove prime wetlands study (wetlands recommended for prime designation are shaded in blue)

Wetland Name	Acres	% total area
Drakes River/Coffin Pond Complex	45.2	0.5
Hampton Salt Marsh Complex	1,745	
Lamprey Pond Complex	111.0	1.2
Line Swamp Complex	131.1	1.4
Little River Complex	48	
Meadow Pond Complex	187	
Old Millpond Complex	69.5	0.8
Old River Complex	157.3	1.7
Smith Colony Complex	65.9	0.7
Taylor River Complex (East)	327.6	3.6
Total	***2,887.6***	***85.1***

Prime Wetland - Hampton Salt Marsh Complex

The Hampton Salt Marsh Complex is approximately 1,745 acres in size and is associated with the mouth of the Blackwater and Hampton Rivers where they enter the Atlantic Ocean. The wetland complex consists of a braided network of flats, channels and *Spartina* spp. plains. The sheer size of this wetland complex, coupled with the rarity of salt marsh in New Hampshire, greatly elevates the value of this wetland. Many other wetlands in Hampton drain to this wetland system. This wetland supports abundant populations of wading birds and other waterfowl, serves as a breeding ground and habitat for many species of baitfish and crustaceans, and is important habitat for larger fish species such as striped bass. Additionally, this wetland complex (contiguous with the Hampton Falls Salt Marsh Complex) provides significant flood storage and protection from tidal storm surges. While the Hampton Salt Marsh Complex is protected by a state-regulated tidal buffer zone[10], it is also protected by additional local regulations in the

[10] Wt-202.90 "Tidal Buffer Zone" means the area extending landward 100 feet from the highest observable tide line. This area can contain wetlands, transitional areas, and natural and developed upland areas.

Hampton Zoning Ordinance, Article II, Section 2.3 Wetland Conservation District which includes designation as a prime wetland.[11]

4.5 Protection and Threats

Local Protection

In 1985, Hampton adopted wetland protections in the zoning ordinance, Article II, Section 2.3 Wetland Conservation District to protect, preserve and prevent the despoliation and unregulated alterations of tidal and inland (freshwater) wetlands, poorly and very poorly drained soils and their buffers. The purpose of the ordinance is to protect the valuable functions provided by wetlands and their buffers including habitat for fish, wildlife and flora, ground water recharge and quality, stormwater and flood control, nutrient and pollution reduction, recreation and aesthetic enjoyment.

The ordinance provides for a 50 foot naturally vegetated buffer from the boundary line of freshwater and tidal wetlands, very poorly drained soils and poorly drained soils. The ordinance also limits the percent of wetlands, very poorly drained soils and poorly drained soils that can be included in the minimum area for new lots, and requires setbacks for septic systems, structures and impervious surfaces.

The following uses are permitted in inland (freshwater) wetlands consistent with best management practices: forestry and tree farming, agriculture, wells for water supply and water impoundments, wildlife habitat management, conservation areas, nature trails, parks and passive recreation, and drainage ways by Special Permit and in consultation with the Conservation Commission. By Special Permit roads, driveways, access ways, utilities and power lines may be constructed providing certain conditions are met and impacts are minimized.

State Protection

The State regulates wetlands by RSA 482-A and administers a wetlands permitting program through NH Department of Environmental Services (NH DES), Wetlands Bureau under Env-Wt 100-800 Wetlands Rules. Since 1967, New Hampshire has required permits for activities that impact or result in the loss of wetlands. While state law requires that dredging and filling of jurisdictional wetlands must be avoided and impacts minimized, more than 2,000 permits each year are issued for unavoidable impacts.

Threats

The Planning Board and Conservation Commission recognize the ongoing need to protect wetlands in Hampton. Although state and local protection exists, valuable wetlands are nonetheless lost to development each year. Land development and other human activities that require dredging, filling, and construction in wetland and surface water resources can result in significant impacts on the environment. These impacts affect the functions and values of wetlands and surface waters, such as wildlife habitat, water quality renovation, or flood storage.

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[11] *Prime Wetland Inventory Report Town-Wide Inventory Phase II, Hampton and Hampton Falls, NH* (2006), Gove Environmental Services

In the past, the salt marsh system was altered often creating restrictions in the natural flow of water and tide. Hampton has taken steps to actively restore the quality of the saltmarsh. Refer to Section 6.8 Salt Marsh Restoration Projects for detailed information about this topic.

Invasive Species Control

Phragmites

The New Hampshire Coastal Program has recently adopted an approach to prevent the colonization of new invasive plants, including Phragmites and Pepperweed. That is not to say that efforts to control Phragmites have been abandoned; however, the Coastal Program has shifted focus after having seen no appreciable gains made on Phragmites control, other than through dramatic habitat manipulation, which is cost prohibitive and time intensive. Pursuing Phragmites control through spraying has proven to be not particularly favored by municipalities or by the public and often difficult from a permitting perspective. Mechanical Phragmites treatments mitigate the negative effects but are costly and don't have long term sustainability as an eradication technique. Massachusetts, particularly in the Parker River Wildlife Refuge Area, has taken dramatic steps in combating Phragmites including broadcast herbicide application, fire, and mechanical treatment.

In order to achieve adequate control of Phragmites, state government and local municipalities would need to re-assess the regulatory framework, current knowledge of the ecosystem threats of Phragmites, as well as funding mechanisms. Otherwise, effective control is not feasible; hence why prevention is the route that the state is pursuing now. It should be noted that Phragmites is listed in New Hampshire's emergency management plan as a significant fire risk, particularly in densely populated areas.

Perennial Pepperweed

Perennial pepperweed (Lepidium latifolium) is a plant that has long been established in the west but is a recent threat in New Hampshire. This plant recently began its spread northward from the Great Marsh in Massachusetts. In the Northeast, Pepperweed tends to be found in salt marshes and areas of disturbance like roadside areas. Pepperweed is detrimental to the local coastal ecosystem due to its ability to out compete local vegetation and its inability to provide suitable habitat for local wildlife.

The New Hampshire Coastal Program has been working with the town of Hampton on this issue and is employing an early detection, rapid response approach. Early detection is a combination of official

assessment for Pepperweed in the seacoast area and the assistance of towns in alerting the Coastal Program to any possible sightings of this plant. The rapid response component involves taking immediate measures to mitigate the effect of its presence. The Hampton Transfer Station is one of two locations where Pepperweed has been identified. In both 2008 and 2009, mechanical means of control, specifically hand pulling, were used to control Hampton's population of this species by July before it had gone to seed. Also, the Coastal Program has recently received permitting allowing for the application of herbicide which will be utilized on any re-growth of Pepperweed occurring in the later summer months of 2009.

The Hampton community has been invaluable in assisting with the promotion of public awareness of Pepperweed. The Hampton Conservation Commission has provided the New Hampshire Coastal Program an avenue to discuss possible methods of public education and dissemination of informative materials. The town has also agreed to show slides on their public access television station outlining key characteristics in identifying the plant and the appropriate contacts to report occurrences of the species.

Mitigation and Restoration

The NH Department of Environmental Services, Wetlands Bureau implements the state's Wetland Mitigation Program. The purpose of mitigation is to achieve no net loss of wetland functions and values resulting from development and other forms of land alteration for which the NHDES issues a permit. There are several steps necessary in evaluating whether the no net loss of wetland functions and values is being met as part of the state's permitting process. First, a functional assessment needs to be completed by a qualified professional to determine the functions and values a wetland performs within the context of the broader landscape. Once the functions and values that would be lost in the post-developed condition are identified, compensatory mitigation can be provided to achieve the replacement or protection of similar functions and values lost through filling and/or alteration of wetlands or other water resources.

When the impacts are significant and a permit is issued, the permitee must provide compensation for the loss of the functions and values (called compensatory mitigation). NH DES requires that certain projects mitigate their wetland impacts by conducting one (or more) of the following activities:

1. Restore a previously existing wetland;
2. Create a new wetland, or
3. Preserve land (at least 50 % of upland areas surrounding a resource) to protect the values of certain wetlands or other water resources.

4.6 Recommendations

WT 1 Conduct an evaluation of freshwater wetlands to identify potential mitigation opportunities that will enhance water quality and habitat, and other wetland functions. These pre-identified sites could be considered by the NHDES to fulfill the requirement for compensatory mitigation as part of wetland permits issued for sites in Hampton.

WT 2 Develop a public outreach and awareness program aimed at residents to promote stewardship on private property.

WT 3 Conduct an audit of ordinances and regulations to identify conflicting requirements and recommend revisions that would improve or strengthen protection of wetlands and their buffers.

5.0 GROUNDWATER RESOURCES AND WATER SUPPLY

5.1 Groundwater Resources

Protection

The protection and wise use of water resources are of critical concern to Hampton. With the entire population of the town dependent upon groundwater as a drinking water supply, the quantity and quality of this resource must be protected from excessive depletion and contamination. Surface waters are also important because of their hydrological connection to and ability to recharge groundwater resources. It is the responsibility of the town to take reasonable precautions to protect groundwater resources from the potential harmful affects of certain land uses and activities to protect the health and general welfare of the community.

Aquifers

Groundwater is a concentration of subsurface water, occurring in unconsolidated earth materials and fractured bedrock formations. It is recharged through precipitation, snowmelt, and surface water infiltration. Aquifers are found where these materials and fractures are filled or saturated with water. If excessive compaction of the earth surface or extensive impervious cover occurs, the amount of surface water that infiltrates the saturated zones or groundwater recharge is reduced.

Aquifers of medium to high potential for groundwater yield occur in the seacoast region as glacial deposits of sand and gravel (unconsolidated materials) or in fractured bedrock. In terms of the hydrologic cycle, approximately one half of the average annual precipitation in the seacoast region is returned to the atmosphere as evapotranspiration, while the other half flows to surface waters or infiltrates as groundwater storage.

Stratified Drift Aquifer
Unconsolidated materials, called stratified drift deposits, contain sorted layers of gravel, sand, silt and clay. These deposits have high potential groundwater yield due to their permeability, or the abundance of interconnected pore spaces where water is stored.

1n 1993, the United State Geological Survey (USGS) completed a study of the region's groundwater resources. The report, *Geohydrology and Water Quality of Stratified Drift Aquifers in the Lower Merrimack and Coastal River Basins, Southeastern NH*, identified a large 110 acre stratified drift aquifer located roughly in the central area of Hampton, and extending into North Hampton. As shown on Map 6-Groundwater Resources (refer to Appendix G), most areas in the aquifer have transmissivities ranging from 1,000-2,000 gallons per day and 2,000-4,000 gallons per day, with isolated areas having transmissivity of greater than 4,000 gallons per day (data source from a study by the U.S. Geological Survey and NH Department of Environmental Services, Water Supply Engineering Bureau, 2002).

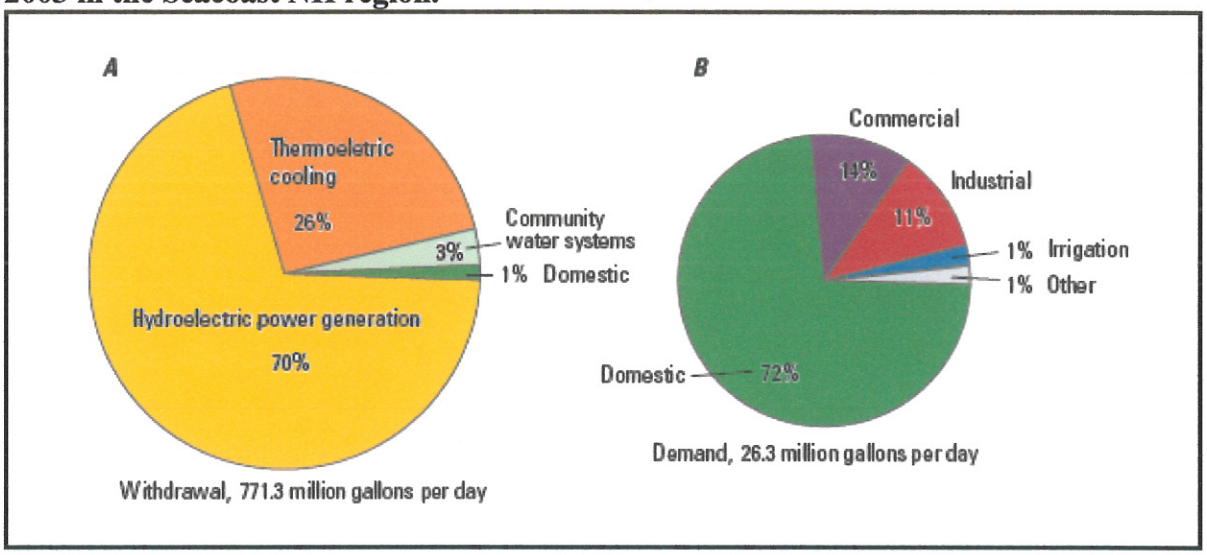
Bedrock Aquifer

Fractured bedrock typically does not yield high quantities of groundwater compared with stratified drift deposits. Bedrock aquifers are more productive when the bedrock is covered by a layer of sand and gravel, which allows recharge to occur directly from the surface. These aquifers are usually adequate for domestic wells serving a small population, and therefore should not be overlooked as a contributing source of a community's water supply needs.

5.2 Sustainability and Availability

Sustainability of water resources requires that water use be balanced with available water resources. Determining the sustainability of and effectively managing water resources requires a thorough understanding of the available resources, documentation of existing water use, and projections of future water use. The seacoast region in southeastern New Hampshire has experienced a 37 percent population increase during 1980 to 2000 (NH Office of Energy and Planning, 2001). This population increase and associated urban development has been accompanied by an estimated 50 percent increase in the use of groundwater and surface water for domestic, industrial, commercial, irrigation, and other purposes. The estimated mean annual per capita water-demand in the Seacoast region is 75 gal/day, which reflects increase up to 92 gal/day during the summer and decrease to 63 gal/day during the winter.[12]

Figure 6. Water withdrawal and water demand (excluding non-consumptive use) in 2003 in the Seacoast NH region.



[12] Horn, M.A., Moore, R.B., Hayes, Laura, Flanagan, S.M., 2008, Methods for and Estimates of 2003 and Projected Water Use in the Seacoast Region, Southeastern New Hampshire: U.S. Geological Survey Scientific Investigations Report 2007–5157, 87 p., plus 2 appendixes on CD-ROM.

Large Groundwater Permitting Program

In 1998, two State laws, the Groundwater Protection Act (RSA 485-C) and the Safe Drinking Water Act, were amended to ensure that no adverse impacts to water users or water dependent natural resources occur as a result of a new large groundwater withdrawal. Adverse impacts are defined as: reduction in capacity of public drinking water, municipal, residential and nonresidential supplies; reduction of surface water levels causing violation of surface water rules and groundwater discharge permit conditions; net loss of values for submerged tidal and fresh lands and wetlands; contamination of groundwater and aquifers by alteration of flow; and exceedance of the long-term rate of replenishment of aquifers.

Table 18. Large groundwater permits in Hampton

Type	Number
Community Water Supplier (Aquarion Water Company)	3
Commercial/Industrial	13
Residential	2
Municipal	1
Total	***19***

Any groundwater withdrawal from a new well having a maximum withdrawal of 57,600 gallons per day or more is considered to be a large groundwater withdrawal. A new large groundwater withdrawal will be designated as either minor or major based upon the magnitude of the proposed withdrawal and/or the potential impacts associated with developing a new withdrawal at a given site. A new large groundwater withdrawal with a minor designation will have to undergo a less intense hydrogeologic analysis and testing program than that of a withdrawal with major designation.[13]

Water Use Registration and Reporting Program

The Water Use Registration and Reporting Program, initially authorized by Chapter 402 Laws of 1983, is implemented by the Department of Environmental Services (DES). The objective of the program is to gather accurate data on the major uses of the state's water and the demands placed upon individual aquifers, streams and rivers. To accomplish this objective, all facilities that use more than 20,000 gallons of water per day, averaged over a seven-day period, must register with DES. "Use" of water means the withdrawal of water from a source, transfer of water from one location to another, return of water to the environment, and facilities which may receive water from a public supplier or return water to a community wastewater treatment plant. The program is important for several reasons in that it provides: 1) basic baseline information regarding major water uses; 2) improved management of water resources through understanding of water use trends and projection of future water demands and associated effects, and 3) a tool for ensuring compliance with laws, regulations and water rights.[14]

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[13] NH Department of Environmental Services, Large Groundwater Permitting Program website at http://des.nh.gov/organization/divisions/water/dwgb/dwspp/lg_withdrawals/index.htm

[14] NH Department of Environmental Services, Fact Sheet CO-GEO-4 Water Use registration and Reporting in New Hampshire (2007)

5.3 Drinking Water Supply

Aquarion Water Company of New Hampshire

The Aquarion Water Company of New Hampshire, a private commercial business, operates water production and storage facilities, and other water distribution systems in Hampton. The production facilities include four wells and the storage facilities include three storage tanks. Aquarion currently has approximately 7,000 active water service users, of which 700 are seasonal service users. Statistical information about their water facilities and systems are shown in Table 18 below.

Table 19. Aquarion Water Company of New Hampshire facilities, systems, and estimated water use in Hampton

Production Facilities			**Capacity (MGD)**
Well 6			0.43
Well 7			0.50
Well 9			0.42
Well 11			0.72
Storage Facilities			**Capacity (Mgal)**
Exeter road Tank			0.75
Glade Path Tank			0.50
Mill Road Tank			1.00
Other Distribution Systems			
Mill Road Booster			
Kings Highway Pressure Reducing Valve			
Tide Mill Road Pressure Reducing Valve			
Estimated Monthly Water Use	**Volume (MGD)**	**Estimated Monthly Water Use**	**Volume (MGD)**
January	1.36	July	2.50
February	1.41	August	2.33
March	1.37	September	1.89
April	1.39	October	1.46
May	1.68	November	1.27
June	2.02	December	1.29

MGD = millions of gallons per day Mgal = millions of gallons

Refer to the Public Facilities Chapter of the Hampton Master Plan for more information about water supply distribution, sources and costs.

Public Drinking Water Systems

Hampton has eight community and two transient non-community public drinking water systems. The existing number of private drinking water wells is estimated at 243. Because the NH DES Public Water Well database includes only those wells installed since 1985, this number is likely substantially less than the actual number of active private drinking water wells that exist today.

Table 20. Public Water Systems and registered private wells

Type	Number Wells
Community Aquarion Water Company of NH Mobile Home Parks, Campgrounds (3) Businesses (4)	8
Transient Non-Community Campgrounds (2)	2
Total Population Served	78,503
Private Wells*	243

* The NHDES Public Water Well database includes wells constructed since 1985.

A Public Water Supply (PWS) is a system for the provision to the public of piped water for human consumption, and has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. A transient non-community water system (TWS)", means a non-community water system that serves at least 25 persons in a transitory setting such as a campground or restaurant for more than 60 days each year.

Note: See Appendix E for additional information about current and projected groundwater and drinking demand and consumptive use.

Local Protections

Aquifer Protection Ordinance

Hampton has adopted an Aquifer Protection District Ordinance (refer to Article II Districts, Section 2.5). The purpose of the ordinance is to protect, preserve and maintain existing and potential groundwater supplies and related groundwater recharge areas within known aquifers from adverse development, land use practices or depletions. The ordinance further acknowledges that the future growth and development of the town, in accordance with the Master Plan, must assure the future availability of unpolluted public and private water supplies and encourage safe uses that can be appropriately and safely located in aquifer recharge areas.

The ordinance provides development related standards including requirements for the following:

Standard	Description of Requirements
Minimum Lot Size	One third greater than the minimum required for underlying district
Maximum Lot Coverage	Impervious surfaces: 25% of lot for residential use; 60% of lot for non-residential use
Site Drainage	All runoff from impervious surfaces shall be infiltrated/recharged on the site and diverted toward areas with vegetative cover
Use of Deicing Chemicals	Minimal use on all public and private roads and parking lots
Prohibited Uses	10 uses that pose a high risk of contamination of groundwater and soils
Conditional Uses	Industrial, manufacturing and commercial uses; multi-family residential uses; sand and gravel excavation and other mining

5.4 Recommendations

GW 1 Evaluate the projections reported in the study *Methods for and Estimates of 2003 and Projected Water Use in the Seacoast Region, Southeastern New Hampshire* (2008) to determine whether there is a need to conduct any long term land use and growth planning related to future availability of groundwater resources.

GW 2 Conduct an audit of ordinances and regulations to identify any conflicting requirements and determine whether adequate protections exist to maintain high quality groundwater resources.

6.0 COASTAL RESOURCES

6.1 Coastal Character

The coastline of NH is predominantly rocky with sandy beaches and some sand dunes. Directly inland from the coast are low hills, broad lowlands, and estuaries. Some of the hills are glacial drumlins and the lowlands are generally marine or lacustrine plains. Tidal marshes are widespread throughout the estuaries and behind the coastal beaches. Small low-gradient rivers - such as the Piscassic, Winnicut, and Taylor Rivers - drain most of these low lying areas. Great Bay, Hampton Harbor and the Piscataqua and Squamscott Rivers are prominent bodies of tidal water. The average daily tidal range of Hampton Harbor is 8.3 feet.[15] Hampton has nearly six miles of ocean shoreline consisting of sandy beaches and rocky shores.

In 1791, a canal was cut through the marshes, which opens an inland navigation from Hampton, through Salisbury into Merrimac River for about eight miles. By this passage, the canal opened a passage from the Blackwater River, which leads to Walton's tide mill, in Seabrook, inside of Plum beach, to the Merrimac.[16]

John Greenleaf Whittier, a New England Quaker poet, wrote often in his lifetime of Hampton. His poems, as in the concluding verse from *Hampton Beach* included below, attest to his fondness for the town's beaches, people, history and legends. Although never a resident of Hampton, the poet takes a permanent place among the town's distinguished citizens as a writer of nature and local history and culture.

"So then, beach, bluff and wave, farewell: I bear with me
No token stone nor glittering shell,
But long and oft shall Memory tell
Of this brief thoughtful hour of musing by the sea."
From *Hampton Beach* (1843)[17]

6.2 Hampton Beach Master Plan

Section D Environment and Open Space of the Hampton Beach Master Plan provides a more detailed overview of the following natural resources of Hampton Beach:

- Hampton Seabrook Marsh and Estuary
- Regulation of Tidal Marsh Activity
- Current Conditions and Issues/Analysis
- Air Quality

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[15] Rockingham County Soil Survey, U.S. Department of Agriculture Soil Conservation Service in cooperation with the New Hampshire Agricultural Experiment Station, 1994

[16] Joseph Dow, *History of Hampton*, Chapter 29, Part 11 "Canal to Salisbury / Nudd's Salt Works"

[17] Poems of John Greenleaf Whittier, Illustrated, New Revised Edition, Riverside Press, Cambridge, 1879

Key recommendations of the Hampton Beach Master Plan to protect coastal resources include:

- Dune protection by developing a dune and sand management program;
- Protection of estuarine resources including shellfish;
- Implement flood protection programs and infrastructure improvements;
- Environmental protection of wetlands; and
- Enhance water quality of wetlands through conservation easements and stormwater protection.

6.3 Hampton-Seabrook Marsh and Estuary

The Hampton-Seabrook marsh and estuary lie within the Taylor River and Hampton River subwatershed of the greater Coastal watershed. The marsh and estuary comprise 5,000 acres, of which 1,554 acres are in Hampton, and is the largest tidal resource in New Hampshire. The marsh and estuary represent nearly 20 percent of Hampton's total area and contains several water courses and waterbodies including Hampton River, Tide Mill Creek, Nudds Canal, Blind Creek, Nilus Brook, Eel Ditch, Meadow Pond and Old Mill Pond (fresh water). The marsh estuarine system provides habitat for several rare and endangered plants and animal species, migratory birds and other wildlife. It is an important fish and shellfish production area. The marsh provides flood protection for adjacent uplands and protects water quality by trapping and removing pollutants from runoff. The tidal waterbodies and watercourses are also highly valued for open space, recreation, educational, historical and archeological purposes.[18]

6.4 Beaches and Dunes

Beach Pollution and Closings

The Natural Resource Defense Council's 2007 annual survey of water quality and public notification at U.S. beaches found that pollution caused the number of beach closings and advisories to reach the second-highest level in the 18-year history of the report. The number of 2007 closing and advisory days at ocean, bay, and Great Lakes beaches topped 20,000 nationally for the third consecutive year, confirming that our nation's beaches continue to suffer from serious water pollution. In the 2007 survey, New Hampshire, at Hampton Beach, received a five star rating as one of a handful of states that reported less than 5 percent exceedances of the National Daily Standard in 2007 at its beaches.

Aging and poorly designed sewage and stormwater systems are the source of most beach water pollution. Nationally, the number of closing and advisory days due to sewage spills and overflows more than tripled to 4,097 from 2006 to 2007, but the largest known source of pollution continues to be contamination from stormwater, which caused more than 10,000 closing and advisory days in 2007. Unknown sources of pollution caused more than 8,000 beach closing and advisory days. [19]

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[18] Hampton Beach Master Plan (2001)

[19] Natural Resource Defense Council at http://www.nrdc.org/water/oceans/ttw/titinx.asp

Dunes

Hampton has limited sand dune resources. As reported in the NH Wildlife Action Plan (refer to Section 7.1 for more information), Hampton has 48 acres of sand dunes along its coastline, of which 19 acres or 38 percent are protected by conservation measures.

Natural Habitat Community	Acres	Conserved Acres	% Conserved
Sand Dune	48	19	39.0

6.5 Coastal Areas

The coast line of Hampton consists of approximately 5.4 miles of sandy beaches and rocky shoreline. The coast is marked by a prominent headland or peninsula, called Great Boar's Head. The majority of the coast consists of low, sandy beaches, notably Hampton Beach and North Beach. In several areas, these beaches are indented by small coves and at low tide their broad intertidal zones are revealed. The sands from these beaches consist of quartz, mica and other dark minerals derived from the igneous, metamorphic and volcanic rocks of interior New Hampshire.

6.6 Areas of Scenic Importance

From the summit of Great Boar's Head bold headland views are varied: extending to some of the neighboring towns; the sweeping salt-marsh stretching off to the west and southwest and the meanderings of the Hampton River, the blue summit of Mount Agamenticus to the north in Maine; various headlands along the coast from Cape Neddick in Maine to Cape Ann, in Massachusetts; the Isles of Shoals; and lastly, of the ocean itself, apparently limitless with waves rolling in and breaking upon the rocky shorelands with a deafening roar.[20]

6.7 Salt Marsh Restoration Projects

The following are examples of the tremendous success that New Hampshire Natural Resource Conservation Service (NH NRCS) and its partners have had with salt marsh restoration along the New Hampshire coastline, as identified in the NH NRCS *Evaluation of Restorable Salt Marshes in New Hampshire.* Salt marsh restoration projects that have been completed, are currently in progress, or have been identified in Hampton are described below. For the vast majority of completed projects, NH NRCS provided biological and ecological guidance on native ecosystem restoration, engineering technical assistance on salt marsh hydrology and flood damage reduction, and cost-sharing through the NHDES Wetlands Reserve Program.[21]

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[20] Joseph Dow, *History of Hampton*, Chapter 1 - Part 1, Topography

[21] New Hampshire Natural Resource Conservation Service, Cooperative Salt Marsh Projects at http://www.nh.nrcs.usda.gov/technical/Ecosystem_Restoration/Salt_marsh_projects.html

Brown's River
The tidal restriction at Brown's River was along an inactive railroad line at the boundary between Seabrook and Hampton Falls. The 48" culvert originally installed by the railroad was too small and the invert (bottom) too high to allow adequate tidal flow to approximately 41 acres within the Great Salt Marsh shared with Hampton. The restrictive culvert is located on the property of the Seabrook Nuclear Power Station. The fact that the water in the pipe is higher than the water in the creek indicates that the embankment is acting as a restriction to tidal flow. The railroad line is presently inactive and some of the track has been removed. The completed project resulted in reestablishing tidal flow to the marsh by replacing the original culverts with a precast 5' x 7' box culvert.

Drakeside Road
At the Drakeside Road site an inadequate road culvert was replaced with a 5 foot by 7 foot concrete box culvert during the fall of 1996. This replacement restored tidal flow to approximately 22 acres of salt marsh.

Little River
The Little River Salt Marsh is a back barrier marsh lying between Little Boar's Head in North Hampton and a rocky headland just south of North Shore Road in Hampton. A USDA Soil Survey indicated that originally the marsh was approximately 193 acres in size. By the 1990's most of the original marsh had deteriorated due to severely restricted tidal flow to the system due to an undersized culvert at Appledore Road and the lack of an adequate connection with the ocean. These flow restrictions also caused serious flooding problems because storm flows from the Little River did not have a stable outlet and created inadequate tidal flow into the marsh and drainage off the marsh after heavy rains. With installation of a 5 foot x 7 foot concrete box culvert at Appledore Road and twin 12 foot concrete box culverts at the north outlet of the marsh, tidal flow has been restored to nearly the entire salt marsh.

Meadow Pond
A storm in the fall of 1996 washed out a culvert which restricted tidal flow to Meadow Pond, a highly degraded salt marsh. The town of Hampton replaced this culvert with 24 foot concrete arch culvert. The new culvert restored adequate tidal flow to approximately 117 acres of degraded salt marsh and eliminating some areas of the invasive plant species *Phragmites*. Although some of the *Phragmites* was removed as part of this restoration project, many acres remain in the vicinity.

6.8 Recommendations

CR 1 Conduct an adaptation planning study to identify existing and potential flood hazards and measures to mitigate the effects of sea level rise and storm events.

7.0 WILDLIFE AND ECOLOGICAL RESOURCES

7.1 Wildlife and Ecological Resources

NH Wildlife Action Plan

The New Hampshire Fish and Game Department collaborated with partners in the conservation community to create the state's first Wildlife Action Plan (2006). The Plan, which was mandated and funded by the federal government through the State Wildlife Grants program, provides New Hampshire decision-makers with important tools for restoring and maintaining critical habitats and populations of the state's species of conservation and management concern - those species identified by the Northeast Wildlife Diversity Technical Committee as a regional concern because of reduced populations or loss of habitat. It is a pro-active effort to define and implement a strategy that will help keep species off of rare species lists, in the process saving taxpayers millions of dollars. The New Hampshire plan is a comprehensive wildlife conservation strategy that examines the health of wildlife. The plan prescribes specific actions to conserve wildlife and vital habitat before they become scarce and more costly to protect. The *New Hampshire Wildlife Action Plan* is available at http://www.wildlife.state.nh.us/Wildlife/wildlife_plan.htm. Refer to Table 11 below for a summary of natural habitat communities and protected lands and as shown on Map 7-New Hampshire's Wildlife Action Plan (see Appendix G.).

Table 21. Important ecological communities identified in the NH Wildlife Action Plan by the NH Fish & Game (2007)

Wildlife Action Plan	Acres	% total area
Highest ranked habitat in biological region	176	1.9
Highest ranked habitat in NH (by condition)	1,546	17.0
Supporting landscapes	1,379	15.2
Total	***3,102***	***34.1***

As reported in the *New Hampshire Wildlife Action Plan*, Hampton has the following natural habitat communities. Collectively these natural habitat communities comprise nearly 61 percent of the total land area of Hampton.

Table 22. Natural habitat communities from the NH Wildlife Action Plan

Natural Habitat Community	Acres	Conserved Acres	% Conserved
Appalachian Oak-Pine	3,433	162	4.7
Grasslands (over 25 acres)	58	0	0
Wet Meadow/Shrub Wetland	273	16	6.0
Peatland	162	3	1.6
Salt Marsh	1,550	209	13.5
Sand Dune	48	19	39.0
Total	***5,524****	***409***	***7.4***

* Comprise nearly 61% of the total land area of Hampton.

Below are descriptions of the natural habitat communities in Hampton.

Appalachian Oak Pine. Appalachian oak-pine forests are found mostly below 900 ft. elevation in southern New Hampshire. These forests include oak, hickory, mountain laurel, and sugar maple, and are typically associated with warmer and drier climatic conditions. Appalachian oak-pine forests are fire-influenced landscapes with nutrient-poor, dry, sandy soils. They are home to hognose snakes, whip-poor-wills, silver-haired bats and other species of concern. Intense development has dramatically reduced the area of this forest type, which comprises some 10% of the state's total land area, in New Hampshire's southern tier.

Sand Dunes. Coastal sand dunes are constantly changing areas of sand and gravel that are deposited by wave and wind action within a marine beach system. Coastal dunes are considered one of New Hampshire's most at-risk habitats and are used by many birds for breeding, migration, or wintering. The most challenging issues facing dune habitat are recreational activities, oil spills, and rising sea level resulting from climate change.

Floodplain Forests. Floodplain forests occur in valleys adjacent to river channels and are prone to periodic flooding. Also referred to as riparian forests, they support diverse natural communities, protect and enhance water quality by filtering and sequestering pollution, and control erosion and sediment. Their rich soils have been used in agriculture for centuries, such that many floodplains are no longer forested wildlife habitat.

Grasslands. Extensive grasslands are defined as areas greater than 10 hectares (~ 25 acres) that are dominated by grasses, wildflowers, and sedges with little shrub or tree cover. Some examples include hayfields, pastures, and cropland (cornfields and other row crops). Grasslands in NH must be mowed to prevent them from becoming shrublands or forests. Only 8 percent of NH grasslands are currently under conservation easements.

Peatlands. Peatlands have water with low nutrient content and higher acidity caused by limited groundwater input and surface runoff. Conservation of the 11 different natural communities that comprise peatlands is vital to the continued existence of many rare plant and wildlife species in New Hampshire. The most challenging issues facing peatlands habitat are development; altered hydrology (amount and flow of water); non-point source pollutants such as road salt, lawn fertilizers, and pesticides; and unsustainable forest harvesting.

Salt Marsh. Salt marshes are grass-dominated tidal wetlands existing in the transition zone between ocean and upland. They are among the most productive ecosystems in the world and are nurseries for several fisheries. Salt marshes also help protect coastal areas from storm surges.

Wet Meadow/Shrub Wetland. Emergent marsh and shrub swamp systems have a broad range of flood regimes, often controlled by the presence or departure of beavers. This system, which is an important food source for many species, is often grouped into three broad habitat categories: wet meadows, emergent marshes, and scrub-shrub wetlands. Marsh and wetlands filter pollutants, preventing them from getting into local streams, and help hold water to reduce flooding.

NH Natural Heritage Bureau

The NH Natural Heritage Bureau report of threatened and endangered species, and species of concern, includes the following species and communities:

- 1 Terrestrial Natural Community
- 6 Estuarine Natural Communities
- 19 Plants
- 9 Birds (vertebrates)
- 1 Fish (vertebrate)
- 6 Insects (invertebrates)
- State Listed: 11 threatened species, 10 endangered species, 7 species of concern
- Federal listed: 1threathened species (Piping Plover)

The complete listing of species by the Natural Heritage Bureau is included in Appendix D.

7.2 Fishery

Finfish that inhabit and are harvested from tidal waters and coastal waters off Hampton include: Amercian Eel, American Shad, Alewife, Bluefin Tuna, Bluefish, Haddock, and Pollock. The most commonly targeted species for fishing in the estuary and along the coastline are Striped Bass and Winter Flounder. Eels, Alewife and Shad are found in the estuary but are rarely harvested. Bluefish and Pollock are seasonally found in nearshore areas, but it is rare to catch a Haddock or Tuna in the waters off Hampton.

7.3 Shellfish

In New Hampshire, the management of shellfish sanitation, harvesting, and resource health is divided among three state agencies. DES is responsible for determining which growing areas meet standards for human consumption of molluscan shellfish. The Fish and Game Department is responsible for issuing harvesting licenses, managing the shellfish resources, and enforcing the open/closed decisions made by DES. The Department of Health of Human Services regulates various aspects of the commercial shellfish industry, including shucking, packing and shipping. The NHDES Bureau of Environmental and Occupational Health issues shellfish and finfish consumption advisories (for high levels of mercury) and general safe eating guidelines for common species of saltwater and freshwater species.

Shellfish and crustaceans harvested from the tidal waters of Hampton include:

Shellfish	*Crustaceans*
Blue Mussels	Rock/Jonah Crabs
Softshell, Surf, Razor Clams	Green Crabs
Sea Scallops	Horseshore Crabs
Oysters	Lobsters
Mahogany Quahogs	Sea Urchins
Whelks	Northern Shrimp

Department of Environmental Services Shellfish Program

The mission of the NH Department of Environmental Services (DES) Shellfish Program is to examine the sanitary quality of the state's tidal waters, in order to ensure that the shellfish in those waters meet standards for consumption by those who enjoy harvesting these public resources. The DES Shellfish Program performs the following: 1) evaluates the sanitary quality of all coastal shellfish growing waters in the state, and ensures that these evaluations are kept current through periodic re-evaluations; 2) identifies pollution sources and other factors that render the state's shellfish resources unfit for human consumption; 3) works with local officials, other state agencies, environmental organizations, and members of the public to eliminate pollution sources, especially those that limit opportunities for shellfish harvesting; and 4) informs and educates the public about the sanitary quality of the state's tidal waters and shellfish resources, as well as potential health risks associated with shellfish.

To ensure the protection of public health, the Shellfish Program maintains a number of monitoring programs in the seacoast area. The Ambient Monitoring Program involves regular collection of water quality samples from over 75 locations in the Great Bay Estuary, Hampton/Seabrook Harbor, Little Harbor, and the Atlantic coast, focusing on monitoring bacteria levels in seawater. Supplemental sampling of seawater and shellfish is conducted following pollution events such as heavy rain, accidental sewage discharges, and others, in order to properly manage temporary closures of harvesting areas. The "Red Tide" Monitoring Program involves the weekly collection of blue mussels from two sites (April through October) to check the levels of Paralytic Shellfish Poison (PSP) toxin in shellfish meats. Shellfish staff assist with the Gulf Watch Program, which monitors the levels of toxic substances in blue mussels on an annual basis. Finally, the Shellfish Program conducts Sanitary Surveys of shellfish growing waters and the surrounding land areas. These surveys, which are required in order to open shellfish beds for harvesting, involve a variety of activities including ongoing pollution source surveys, general water quality monitoring, and hydrographic, meteorologic, and other studies.

NH Department of Health and Human Services, Bureau of Food Protection

The NH Bureau of Food Protection ensures that all shellfish harvested from New Hampshire coastal waters are safe for consumption. The Bureau works in cooperation with the Department of Environmental Services Shellfish Program, with other state agencies and UNH Jackson Estuarine Laboratory to monitor and enforce closings of the Hampton Harbor clam flats on a conditional basis and a section of Little Bay clam flats.

7.4 Recommendations

WE 1 Evaluate the extent and distribution of invasive species of plants, insects and animals in town including but not limited to Phragmites, Pepperweed, Japanese Knotweed, Purple Loosestrife, and Japanese Shore Crab.

WE 2 Continue educational and outreach efforts to increase awareness of the public and others about the negative effects of invasive species.

8.0 FORESTLAND RESOURCES

8.1 Forests and Forest Resources

Historic Forested Areas

The native inhabitants of Rockingham County maintained the area in a dominantly forested condition, consisting of hemlock, red oak, and white pine. Wet soil conditions, wind, natural fires, and land clearing by the native tribes resulted in some openings throughout the forested areas. By the 1600's, early European settlers exploited the forest resource and created vast expanses of open land. The open land generally was used as pasture for livestock and horses. The land was unmanaged, and resource and soil conservation practices were not used for many years later. By the mid 1800's, only about 50 percent of the county remained forested. During this period, agriculture flourished and, at the same time, a shift from farm life to town life began as manufacturing became a more important part of the local economy. By 1952, about 74 percent of the county was forested, 17 percent was used for agricultural purposes and 2 percent was used for urban development.[22]

Historic Trees

Hampton's "Old Elm", an historic landmark believed to be over 300 years old, was located at the intersection of Winnacunnet Road and Elmwood Corner. In 1956, the Old Elm was one of 16 elm trees in Hampton identified by the Department of Agriculture as suspected of having Dutch Elm disease. The trees were subsequently removed and burned to control the spread of the disease.

Current and Historic Forested Areas

Since 1962, Hampton has lost 1,884 acres or 52 percent of its forested lands. Today, 1,720 acres or 18.9 percent of the total land area of town is forested. The largest remaining forested block (approximately 583 acres) is located in the westernmost corner of Hampton, along the Hampton Falls boundary, west of Timber Swamp Road and south of Olde Road. An additional 798 acres of forest lands are comprised of forested wetlands, which are scattered across the uplands areas of town. *Refer to Map 9-Open Space and Unfragmented Lands in Appendix G.*

Table 23. Change in forested Lands from 1962 to 2005

1962		1974		1998		2005	
Acres	% total	Acres	% total	Acres	% total	Acres	% total
3,604.2	40.4	3,509.7	39.4	2,987.9	33.5	1,720.2	18.9

% total = total area of Hampton

[22] Rockingham County Soil Survey, U.S. Department of Agriculture Soil Conservation Service in cooperation with the New Hampshire Agricultural Experiment Station, 1994.

8.2 Urban Forestry

What is an urban forest?

An urban forest is commonly defined as an ecosystem that consists of all the trees, associated vegetation, wild animal life and other natural resources extending from an urban center to the edges of the suburban fringes. Over time, the science and practice of urban and community forestry has evolved into a comprehensive effort to manage, conserve, and enhance forest and tree resources in and around cities, towns, and suburban areas. But unlike traditional forestry, urban and community forestry focuses on managing trees and forests for a variety of societal benefits, primarily in response to population growth and development resulting in expansion of urban and suburban areas.

Street trees, private lawn trees, trees in parks and riparian areas, and small urban forest blocks all play an important role in the lives of urban residents, business owners and wildlife. The benefits provided by urban forests and the challenges in managing them present the urban forester with a unique opportunity to improve the appearance and appeal of communities. While traditional forestry looks more at forest products, recreation potential, and wildlife benefits provided by forests, urban forestry focuses more on the interaction of trees and people, landscape design, and individual tree management (arboriculture).[23]

Function and Value of Urban Forests

Forests provide many social, health, ecological, and economic benefits on local, regional and national levels. Forests provide the following functions: process rainwater through absorption and evapotranspiration; reduce carbon dioxide in the atmosphere; increase groundwater infiltration; improve surface water quality by removing pollutants and nutrients from runoff; and serve as buffers to protect wetlands from sedimentation and contamination. Near surface water bodies, homes, roads and urban areas, trees cool summer temperatures, break winter winds, and filter dust and pollutants from the air.

The "Heat Island Effect"

For many areas experiencing rapid growth and cities, the "heat island effect" is of growing concern. This phenomenon describes urban and suburban temperatures that are 2°F to 10°F (1°C to 6°C) hotter than nearby rural areas and the surrounding natural land cover. Elevated temperatures result from the conversion of natural land cover to impervious surfaces such as parking lots, structures and roads. Natural lands such as parks, open land, trees and bodies of water can create cooler areas in an urban setting. Elevated temperatures can impact communities by increasing peak energy demand, air conditioning costs, air pollution levels, and heat-related illness and mortality.[24]

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[23] Maryland DNR, Urban & Community Forestry Program: http://www.dnr.state.md.us/forests/programs/urban/urbantreecanopygoals.asp

[24] Ibid

Aesthetic and Scenic Quality and Rural Character

The forested landscapes of New Hampshire help define and enrich our quality of life by providing social, ecological and economic benefits. Forested landscapes are inspiration for artists, writers and naturalists, and local residents and tourists that observe the spectacular fall foliage display each year. Forests are also a living landscape in our region where managed woodlands, farms, pastures, meadows and fields are an integral part of the landscape. Forested lands help sustain dynamic communities with clean water and air, forest and agricultural products, habitat for native plants and animals, scenic beauty, jobs, and recreational opportunities.

8.3 Recommendations

FR 1 Review ordinances and regulations to identify opportunities to strengthen preservation of forested lands, and identify opportunities to implement reforestation and urban forestry as part of development approvals (i.e. landscaping requirements and site design techniques).

FR 2 Encourage formation of an urban forestry committee to assist with municipal forest management efforts, urban forestry and tree plantings, and provide technical expertise and information about best practices.

FR 3 Develop a management plan for the Town Forest at Twelve Shares.

FR 4 Identify and establish open space connections with open space or conserved land in town and with contiguous open space or conserved lands in neighboring communities.

9.0 OPEN SPACE AND LAND CONSERVATION

9.1 Overview

Hampton has virtually no land that has not been developed or altered historically in some way by human occupation. Nevertheless, there are large areas of undeveloped acreage that is considered open space. By traditional definition, open space can be defined as land which has not been developed or altered from its natural state. By broader definition, open space may also include farms, playing fields and recreational facilities, reclaimed lands, and stormwater retention areas. The value and benefits of open space to a community is diverse including: scenic beauty, wildlife habitat, aquifer protection, buffers between developed areas, flood control, recreational opportunities, forestry, and agriculture. For this Chapter, open space is any lands which the town believes of value and benefit to protect from development.

As reported in the table below, Hampton has approximately 25 percent or 2,215 acres of open space lands. With addition of water and wetlands, open space lands increase to nearly 61 percent or 5,520 acres of the total area of the town.

Table 24. Open Space land by land cover and land use

Land Cover/Use	Acres	% total area
Active Agricultural	155	1.7
Forest	1,720	18.9
Vacant	340	3.7
Subtotal	***2,215***	***24.4***
Water	475	5.2
Wetlands	2,830	31.2
Total	***5,520***	***60.7***

To maintain the value and benefit to the community, open space must have some sort of legal protection which guarantees the integrity of the land and its resources. Although the town may expend money to acquire and preserve open space, which also generates little tax revenue, the benefits outweigh the costs. Open space improves the quality of life and character of a community, enhances property values overall, and requires less in municipal services (i.e. roads, sewers, schools, emergency services). The preservation of open space should be viewed as an asset to the town, an investment in the future sustainability of land and resources, and a balance to the demands of growth.

As growth continues in the Seacoast region, development is working its way into difficult areas, those with marginal soils, adjacent to wetlands and aquifers, and with other environmental constraints. It has been believed in the past that these lands would remain open space because of the expense and difficulty to develop them; however these marginal lands are now being developed, particularly in areas where water and services have been extended.

Historically, open space has been lost primarily through the development of farmlands and tidal wetlands. Today with improved state and local regulation and land acquisition by the town, state

agencies and private environmental organizations, approximately 1,300 acres of tidal wetlands are preserved in Hampton.

Protection of Open Space

Except for wetlands and buffer protections in the zoning ordinance, Section 2.3 Wetlands Conservation District, the town has no open space and land conservation requirements or policies. In order to preserve the little remaining open space, the town should consider adopting innovative land use controls, both in ordinance and regulations, to promote open space preservation. The town may also consider implementing a transfer of development rights (TDR) program to further encourage voluntary open space preservation. The Hampton Conservation & Public Lands Inventory and Stewardship Plan (Kane & Ingraham, 2009) could be utilized to identify and prioritize sending parcels in such a program.

If Hampton desires to retain what unprotected open space remains, a concerted effort must be made by town officials, land use boards and commissions, and citizens to implement a plan for land protection. Since 1987, a number of warrant articles were approved and funds appropriated to the Conservation Commission accumulation fund for forest preservation and open space protection. These actions protected the Perkins Farm on Barbour Road, the town forest, the Timber Swamp and the historic Twelve Shares area. As important as these actions were nothing further has been done to create a coordinated and comprehensive land protection strategy for the town.

9.2 Conservation Lands

Hampton has 603 acres of conserved lands, of which 71 are full ownership and 6 have conservation easements. The major owners of conserved lands include:

- 18 parcels totaling 90.6 acres owned by the Town of Hampton
- 18 parcels totaling 79.2 acres owned by the NH Fish and Game Department
- 15 parcels totaling 45.7 acres owned by the Society for Protection of New Hampshire's Forests (SPNHF)
- Hampton Beach state Park totaling 222.8 acres owned by the state
- 2 parcels totaling 51.3 acres owned by Hampton Water Works

A complete listing of conserved lands is include in Appendix E.

Public Service of New Hampshire
Public Service of New Hampshire (PSNH) completed an upgrade to its Timber Swamp substation in Hampton, concluding a two-year improvement effort of the Seacoast's power transmission system. PSNH worked with the town of Hampton during permitting and construction of the project, resulting in an increase of conservation land in town. As the substation is between two abutting conservation land properties, PSNH agreed to transfer to the

town by deed 30 acres of Timber Swamp property, resulting in a contiguous strip of conservation land primarily traversed by wildlife.[25]

9.3 Goals and Objectives for Land Protection

Hampton Conservation & Public Lands Inventory

In 2008, Hampton received a grant from the Piscataqua Region Estuaries Project to complete a conservation lands and open space inventory.

Project Scope and Methods
The conceptual framework for the *Hampton Conservation & Public Lands Inventory and Stewardship Plan* (Kane & Ingraham, 2009) emerged after discussions with representatives of the Town and the Piscataqua Region Estuaries Partnership. The project includes a GIS map displaying all conservation and public lands was also produced, and will be enhanced by the submission of any resulting future conservation lands to GRANIT for inclusion in their Conservation Land state-wide GIS database.

The foundation of the project was a comprehensive inventory of properties in Hampton that are either legally restricted by conservation terms in a deed, or that are otherwise considered conservation land by tradition, intent or vote of the town. The Inventory culminated in a Conservation Database produced as a series of worksheets, which was populated with site specific information on each property. Over 450 parcels were initially reviewed as possible conservation and public lands over the course of the project.

Informed by the Conservation Inventory, a Stewardship Plan was produced to help guide the Conservation Commission in its continuing efforts to carry out land conservation and stewardship of their Town-owned conservation and easement lands. Recommendations for stewardship both on specific properties and in general are included.

Results of Inventory

74 parcels were identified in Hampton as being conservation or public lands that were previously mapped by GRANIT in the Conservation Land layer. Additional information on these parcels beyond that included in the GRANIT was added to the entries of these parcels in the Conservation Database. On an acreage basis, of the 9,072 acre total area of Hampton 1,040 acres are now documented as conservation or public land. These lands represent approximately 11.5% of the total town area.

A total of 80 parcels were identified in Hampton as being previously un-mapped conservation or public lands that meet the following study criteria.

- Properties restricted by conservation easements;
- Properties with conservation restrictions in the fee deed;

[25] The Hampton Union, Tuesday, June 26, 2007

- Properties granted to the Hampton Conservation Commission, or that have the Hampton Conservation Commission mentioned in the deed as an authority to the property;
- Properties not specifically restricted, but owned by an organization whose primary purpose is conservation, such as the N.H. Fish & Game Department, or the Society for the Protection of New Hampshire Forests;
- Relatively large, undeveloped open space properties owned by the Town of Hampton that do not have legal conservation restrictions, but that are relatively inaccessible and large. This includes saltmarsh properties and land-locked properties with significant wetlands; and
- Lands co-owned by neighbor and/or owner groups that have Restrictive Covenants for conservation in the deeds.

143 parcels were researched but omitted from the Conservation Lands list because they did not meet the criteria above. These are included as a worksheet named Omitted Properties in the Conservation Database. 71 were omitted for a variety of other reasons such as being already developed or converted, having another specified municipal use such as a school or recreation field, or otherwise did not meet the criteria set for conservation lands.

9.4 Preservation Techniques for Consideration

Hampton as well as it landowners and citizens may have similar reasons for protecting certain lands from development and for preserving vital natural resources. Depending on what type of protection and what is being protected, there are several methods for long-term conservation, including conservation easements, deed restrictions, or transferring full ownership to the town or a local or regional land trust.

Conservation easements allow a landowner to retain ownership while ensuring the permanent conservation of a property. A conservation easement limits the uses of the property and conveys certain rights to a qualified non-profit organization like the Southeast Land Trust or to a governmental agency, who agrees to monitor and enforce the terms of the easement.

Deed restrictions are placed on a property at the time of conveyance to another party. Deed restrictions are only enforceable by the landowner and the landowner's heirs and adjacent landowners who benefit from the restriction. Deed restrictions are simpler to execute than conservation easements, but do not offer as strong protection of the land and its resources.

Transferring full ownership of land to the town or another qualified conservation organization, either through a donation, will, or sale, can best secure the long-term conservation of certain properties.[26]

[26] Southeast Land Trust of New Hampshire at http://www.seltnh.org

9.5 Recommendations

OS 1 Support implementation of the recommendations in the *Hampton Conservation & Public Lands Inventory and Stewardship Plan* (Kane & Ingraham, 2009).

OS 2 Consider adopting innovative land use controls, both in the zoning ordinance and subdivision and site plan regulations, to promote open space preservation.

OS 3 Consider implementation a transfer of development rights (TDR) program to further encourage voluntary open space preservation.

10.0 LOCAL, REGIONAL AND STATEWIDE STUDIES AND PROJECTS

10.1 The Land Conservation Plan for New Hampshire's Coastal Watersheds

Spanning 990 square miles and 46 towns, New Hampshire's coastal watersheds contain exceptional and irreplaceable natural, cultural, recreational and scenic resources. To advance the long-term protection of these resources, the State of New Hampshire, acting through the NH Coastal Program and the NH Estuaries Project, developed a comprehensive, science-based land conservation plan for the state's coastal watersheds. The State also engaged a partnership of The Nature Conservancy, Society for the Protection of New Hampshire Forests, Rockingham Planning Commission, and Strafford Regional Planning Commission to develop the plan. The New Hampshire Charitable Foundation's Piscataqua Region supported this effort as a regional approach to setting land conservation priorities and strategies, and provided funding for the project. The overarching goal of this land conservation plan is to focus conservation on those lands and waters that are most important for conserving living resources - native plants, animals, and natural communities - and water quality in the coastal watersheds. The Plan is available on

The Land Conservation Plan for New Hampshire's Coastal Watersheds prioritizes coastal watershed areas and offers regional strategies for maintaining diverse wildlife habitat, abundant wetlands, clean water, productive forests, and outstanding recreational opportunities into the future. The Plan identifies *Conservation Focus Areas and Supporting Landscapes* - areas considered to be of exceptional significance for the protection of living resources and water quality in the coastal watersheds including *(1) Forest Ecosystems, (2) Freshwater Systems, (3) Irreplaceable Coastal and Estuarine Resources, and (4) Critical Plant and Wildlife Habitat.* Each Conservation Focus Area is comprised of a Core Area that contains the essential natural resources for which the focus area was identified, with the boundary fitted to the real world of roads, forest edges, rivers and wetlands. The *Supporting Landscapes* are lands adjacent to and which provide support functions to the Core Focus Areas. The Land Conservation Plan for New Hampshire's Coastal Watersheds is available on the Nature Conservancy website at http://www.nature.org/wherewework/northamerica/states/newhampshire/projects/art19061.html.

Hampton has three Core Focus Areas – Lower Little River, Taylor River and The Cove, and the Hampton Marsh – totaling 2,814 acres. The Core Focus Areas are described in detail in Table 25 below. *Refer to Map 8-The Land Conservation Plan for New Hampshire's Coastal Watersheds in Appendix G.*

Table 25. Core Focus Areas identified by *The Land Conservation Plan for New Hampshire's Coastal Watersheds*

Core Focus Areas	Acres	% total area
Lower Little River	3.0	0.03
Taylor River and The Cove	499	5.5
Hampton Marsh	2,312	25.5
Total	***2,814***	***31***

Table 26. Description of the Conservation Focus Areas located partially within Hampton

Conservation Focus Area (CFA)	Description of Resources (reported for entire CFA)	
Hampton Marsh (portions located in Hampton Falls, Seabrook and Salisbury, MA)	▪ 7,490 acres (total) ▪ Unfragmented forests blocks: 920 acres and 1,750 acres ▪ Coastal forest blocks: 1 of >500 acres, 1 of > 1,000 acres ▪ High quality stream watersheds: 586.8 ▪ Coastal shoreline: 2.5 miles ▪ Estuarine shoreline: 2.2 miles ▪ Undeveloped shoreland (within 1,000 feet): 165 acres ▪ Saltmarsh: 3,310.8 ▪ Significant wildlife habitats: dunes, grassland, marsh, peatland, ridge/talus ▪ High yield aquifer: 30.5 acres ▪ Water supply: 3 public wells, 206.1 acres of wellhead protection areas ▪ Favorable gravel well sites: 11.9 acres ▪ Farmland Soils – 160.9 acres of prime, 77.8 acres of statewide importance ▪ Permanently protected lands (natural): 346 acres ▪ Permanently protected lands (managed forest): 518 acres ▪ Conserved lands (managed extractive uses): 10 acres	<u>Plants of Conservation Concern</u> Salt-marsh Gerardia, Missouri Rock Cress Sea-beach Needle Grass, Tall Wormwood Yellow Thistle, Gray's Umbrella Sedge Small Spike-rush, Salt-loving Spike-rush Hairy Hudsonia, Slender Blue Flag <u>Animals of Conservation Concern</u> Saltmarsh Sharp-tailed Sparrow Seaside Sparrow, Willet Piping Plover, Horned Lark Osprey, Common Tern, Arctic Tern <u>Exemplary Natural Communities</u> Bayberry-beach plum maritime shrubland (S1) Beach grass shrubland (S1) Brackish marsh (S2) Coastal inter-dunal marsh/swale (S1) Coastal shoreline strand/swale (S2) Dry Appalachian oak-hickory forest (S3) High and low salt marsh (S3) Maritime wooded dune (S1) Saline/brackish intertidal flat (S3) Saline/brackish subtidal channel/bay bottom (S3)

Conservation Focus Area (CFA)	Description of Resources (reported for entire CFA)	
Taylor River and The Cove (portions located in Hampton Falls, Kensington and Exeter)	▪ 2,420 acres ▪ Unfragmented forests blocks: 70% of a 1,460 acre block and 80% of a 1,550 acre block ▪ Aggregated forest block: part of a 11,800 acre block ▪ Rivers and streams: 6.4 miles of 1st order, 6.5 miles of 2nd order, 2.2 miles of 3rd order, 0.9 miles of 4th order ▪ High yield aquifer: 31.5 acres ▪ Water supply: 3 public wells, 83.9 acres of wellhead protection areas ▪ Favorable gravel well sites: 12.5 acres ▪ Farmland Soils – 323.2 acres of prime, 193.3 acres of statewide importance ▪ Permanently protected lands (managed forest): 305 acres ▪ Conserved lands (managed extractive uses): 111 acres	<u>Plants of Conservation Concern</u> Small-crested Sedge <u>Animals of Conservation Concern</u> Great Blue Heron (rookery) <u>Exemplary Natural Communities</u> None known

10.2 New Hampshire Natural Resource Conservation Service (NH NRCS) - *Evaluation of Restorable Salt Marshes in New Hampshire*

In 1993 NRCS performed an inventory of restrictions to tidal flow along the New Hampshire coast identifying road culverts, bridges, and other structures that may be impeding tidal flow into salt marsh areas. The inventory included engineering surveys to assess proper tidal flow and preliminary cost estimates to correct deficiencies. In 1994, the results of this study were published in the document entitled "Evaluation of Restorable Salt Marshes in New Hampshire" (available for download on the NRCS Ecosystem Restoration web site). This report identified 700 acres of salt marsh that were practical to restore.

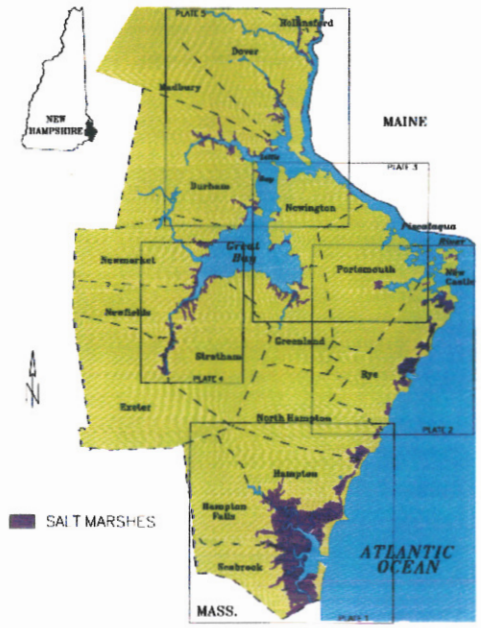


Figure 7. NH NRCS salt marsh restoration projects

As of March 2003, approximately 600 acres have been restored. To date, the NRCS' primary emphasis has been on restoring tidal flow, the twice daily flooding of tides, by replacing inadequate road culverts, restoring tidal creeks through selective ditching, and open marsh water management. Tidal flow is the life blood of salt marshes and without it salt marshes die a slow death.

10.3 Hampton-Seabrook Estuary Restoration Compendium

The Hampton-Seabrook Estuary Restoration Compendium is a compilation of information on the historic and current distributions of salt marsh and sand dune habitats and diadromous fishes within the Hampton-Seabrook Estuary Watershed. Developed by Alyson Eberhardt and Dave Burdick, University of New Hampshire Jackson Estuarine Laboratory with funding from the NHCP and the New Hampshire Estuaries Project, the compendium is a tool to help communities and organizations restore sand dunes, salt marsh, and diadromous fish in the Hampton-Seabrook Estuary Watershed. The Hampton-Seabrook Estuary Restoration Compendium presents:

- A narrative describing the methods used and the results of analyses;
- A series of maps detailing change in sand dune and salt marsh extent over time;
- The current and historic distribution of seven target diadromous fish species; and
- Identifies examples of prominent restoration opportunities within the Hampton-Seabrook Estuary Watershed.

The final Hampton-Seabrook Estuary Restoration Compendium will be available in 2009, and the maps and figures for this study are currently available for viewing and download as PDF files on the New Hampshire Coastal Program website at http://des.nh.gov/organization/divisions/water/wmb/coastal/restoration/compendiums.htm#hampton

10.3 Recommendations

SP 1 Identify opportunities to strengthen protection of the Core Focus Areas identified in *The Land Conservation Plan for New Hampshire's Coastal Watersheds* (i.e. implementation of conservation subdivisions, conservation overlay districts, site design for non-residential development).

APPENDICES

Appendix A	Recommendations and Implementation Plan
Appendix B	List of Soil Map Units and Farmland Soil Map Units
Appendix C	Natural Heritage Bureau Information
Appendix D	Conserved Lands
Appendix E	Groundwater Resources and Statistics for Hampton
Appendix F	Additional References
Appendix G	Map Set

APPENDIX A Recommendations and Implementation Plan

1.0 Introduction

INT 1 The town may consider undertaking a growth and planning study to evaluate build-out conditions under current zoning, and alternative build-out scenarios that would provide necessary protection of important natural resources while accommodating projected growth and associated development.

INT 2 The town may consider evaluating their development regulations to address impervious surface coverage by requiring site design standards and stormwater measures to mitigate any future potential effects to water quality.

2.0 Natural Conditions and Landscape

NL 1 Evaluate land use ordinances and regulations to address development on lands with limited potential and those areas not served by municipal water and sewer services.

NL 2 Evaluate ordinances and regulations to determine the level of protection and/or conservation of important farmland soils, and revise if current requirements are not adequate to meet the town's goals for protection of the resource.

3.0 Surface Water Resources

SW 1 Develop a Surface Water Resources Management and Protection Plan per RSA 4-C:22.

SW 2 The town should consider the quantity of water available to meet existing and projected demand when considering growth management options.

SW 3 When possible, the town should take a watershed approach to protecting water resources and managing stormwater and other drainage issues.

SW 4 The town should participate in and encourage regional coordination in addressing water supply needs and water resource management.

SW 5 The town should consider adopting building codes or regulations requiring installation of water efficient fixtures for new construction, and encourage selection of water efficient appliances.

SW 6 The town should implement water conservation measures including but not limited to conservation programs, public outreach campaigns, a comprehensive water usage and loss budget, and a leak detection program.

SW 7 The town should conduct a municipal water use audit and implement methods to reduce municipal water consumption.

SW 8 Evaluate the Stormwater Master Plan considering the following: consistency with existing land use and development regulations; current function of the existing drainage infrastructure; and identification of future improvements based on existing conditions as well as growth and build-out projections, and incorporating innovative best management practices and site design methods for new development and redevelopment.

4.0 Wetlands

WT 1 Conduct a field evaluation of freshwater wetlands to identify potential mitigation opportunities that will enhance water quality and habitat, and other wetland functions.

WT 2 Develop a public outreach and awareness program aimed at residents to promote stewardship on private property.

WT 3 Conduct an audit of ordinances and regulations to identify conflicting requirements and recommend revisions that would improve or strengthen protection of wetlands and their buffers.

5.0 Groundwater Resources and Water Supply

GW 1 Evaluate the projections reported in the study *Methods for and Estimates of 2003 and Projected Water Use in the Seacoast Region, Southeastern New Hampshire* (2008) to determine whether there is a need to conduct any long term land use and growth planning related to future availability of groundwater resources.

GW 2 Conduct an audit of ordinances and regulations to identify any conflicting requirements and determine whether adequate protections exist to maintain high quality groundwater resources.

6.0 Coastal Resources

CR 1 Conduct an adaptation planning study to identify existing and potential flood hazards and measures to mitigate the effects of sea level rise and storm events.

7.0 Wildlife and Ecological Resources

WE 1 Evaluate the extent and distribution of invasive species of plants, insects and animals in town including but not limited to Phragmites, Pepperweed, Japanese Knotweed, Purple Loosestrife, and Japanese Shore Crab.

WE 2 Continue educational and outreach efforts to increase awareness of the public and others about the negative effects of invasive species.

8.0 Forest Resources

FR 1 Review ordinances and regulations to identify opportunities to strengthen preservation of forested lands, and identify opportunities to implement reforestation and urban forestry as part of development approvals (i.e. landscaping requirements and site design techniques).

FR 2 Encourage formation of an urban forestry committee to assist with municipal forest management efforts, urban forestry and tree plantings, and provide technical expertise and information about best practices.

FR 3 Develop a management plan for the Town Forest at Twelve Shares.

FR 4 Identify and establish open space connections with open space or conserved land in town and with contiguous open space or conserved lands in neighboring communities.

9.0 Open Space and Land Conservation

OS 1 Support implementation of the recommendations in the *Hampton Conservation & Public Lands Inventory and Stewardship Plan* (Kane & Ingraham, 2009).

OS 2 Consider adopting innovative land use controls, both in the zoning ordinance and subdivision and site plan regulations, to promote open space preservation.

OS 3 Consider implementation a transfer of development rights (TDR) program to further encourage voluntary open space preservation.

10.0 Local, Regional and State Studies and Projects

SP 1 Identify opportunities to strengthen protection of the Core Focus Areas identified in *The Land Conservation Plan for New Hampshire's Coastal Watersheds* (i.e. implementation of conservation subdivisions, conservation overlay districts, site design for non-residential development).

IMPLEMENTATION PLAN FOR RECOMMENDATIONS

The table below contains the recommendations listed previously and provides the following information for implementation: 1) estimated time frame for completion, 2) assigns a lead for implementation, and 3) describes funding and support necessary for implementation. Short Term Tasks may be completed within a 1 to 3 year timeframe. Long Term Tasks may be completed within a 4 to 6 year timeframe. Ongoing Tasks are assumed to be established activities or new activities that will be implemented indefinitely.

#	Recommendation	Assigned Lead (support)	Funding/Support Needs
Short Term Tasks (1-3 years)			
INT 1	The town may consider undertaking a growth and planning study to evaluate build-out conditions under current zoning, and alternative buildout scenarios that would provide necessary protection of important natural resources while accommodating projected growth and associated development.	Town Planner (Planning Board)	Consultant and/or planning services
INT 2	The town may consider evaluating their development regulations to address impervious surface coverage by requiring site design standards and stormwater measures to mitigate any future potential effects to water quality.	Town Planner (Planning Board)	Consultant and/or planning services
NL 1	Evaluate land use ordinances and regulations to address development on lands with limited soil potential and suitability for development and those areas not served by municipal water and sewer services.	Town Planner (Planning Board)	Consultant and/or planning services
NL 2	Evaluate land use ordinances and regulations to determine the level of protection and/or conservation of important farmland soils, and revise if current requirements are not adequate to meet the town's goals for protection of the resource.	Conservation Commission (Planning Board)	Planning services, UNH Cooperative Extension
SW 5	The town should consider adopting building codes or regulations requiring installation of water efficient fixtures for new construction, and encourage selection of water efficient appliances.	Town Planner (Building Inspector)	Staff
SW 8	Evaluate the Stormwater Master Plan considering the following: consistency with existing land use and development regulations; current function of the existing drainage infrastructure; and identification of future improvements based on existing conditions as well as growth and build-out projections, and incorporating innovative best management practices and site design methods for new development and redevelopment.	Public Works Dept. (Planning Board)	Consultant and/or planning services
WT 2	Develop a public outreach and awareness program aimed at residents to promote stewardship on private property.	Conservation Commission	Outreach materials, event planning

WT 3	Conduct an audit of ordinances and regulations to identify conflicting requirements and recommend revisions that would improve or strengthen protection of wetlands and their buffers.	Conservation Commission (Town Planner, Planning Board)	Consultant and/or planning services
GW 2	Conduct an audit of ordinances and regulations to identify any conflicting requirements and determine whether adequate protections exist to maintain high quality groundwater resources.	Conservation Commission Town Planner (Planning Board)	Consultant and/or planning services
OS 2	Consider adopting innovative land use controls, both in the zoning ordinance and subdivision and site plan regulations, to promote open space preservation.	Planning Board Town Planner	Consultant and/or planning services
Long Term Tasks (3-6 years)			
SW 1	Develop a Surface Water Resources Management and Protection Plan per RSA 4-C:22.	Planning Board (Conservation Commission)	Consultant and/or planning services
SW 2	The town should consider the quantity of water available to meet existing and projected demand when considering growth management options.	Town Administrator (Planning Board)	Consultant and/or planning services
SW 7	The town should conduct a municipal water use audit and implement methods to reduce municipal water consumption.	Town Administrator (Public Works Dept.)	Staff
WT 1	Conduct a field evaluation of freshwater wetlands to identify potential mitigation opportunities that will enhance water quality and habitat, and other wetland functions.	Conservation Commission	Consultant and/or planning services
GW 1	Evaluate the projections reported in the study *Methods for and Estimates of 2003 and Projected Water Use in the Seacoast Region, Southeastern New Hampshire* (2008) to determine whether there is a need to conduct any long term land use and growth planning related to future availability of groundwater resources.	Planning Board	Consultant and/or planning services
CR 1	Conduct an adaptation planning study to identify existing and potential flood hazards and measures to mitigate the effects of sea level rise and storm events.	Conservation Commission (Board of Selectmen)	Consultant and/or planning services
SP 1	Identify opportunities to strengthen protection of the Core Focus Areas identified in *The Land Conservation Plan for New Hampshire's Coastal Watersheds* (i.e. implementation of conservation subdivisions, conservation overlay districts, site design for non-residential development).	Conservation Commission Town Planner	Staff
OS 1	Support implementation of the recommendations in the *Hampton Conservation & Public Lands Inventory and Stewardship Plan* (Kane & Ingraham, 2009).	Conservation Commission, Town Planner	Staff
OS 3	Consider implementation of a transfer of development rights (TDR) program to further encourage voluntary open space preservation.	Planning Board	Consultant and/or planning services
FR 2	Encourage formation of an urban forestry committee to assist with municipal forest management efforts, urban forestry and tree plantings, and provide technical expertise and information about best practices.	Conservation Commission (Board of Selectmen)	Staff

FR 3	Develop a management plan for the Town Forest at Twelve Shares.	Conservation Commission	Consulting services, UNH Cooperative Extension
FR 4	Identify and establish open space connections with open space or conserved land in town and with contiguous open space or conserved lands in neighboring communities.	Planning Board (Conservation Commission)	Southeast Land Trust of NH
Ongoing Tasks			
SW 3	When possible, the town should take a watershed approach to protecting water resources and managing stormwater and other drainage issues.	Town Planner Conservation Commission (Public Works Dept.)	Regional watershed and river advocacy groups
SW 4	The town should participate in and encourage regional coordination in addressing water supply needs and water resource management.	Town Manager (Town Planner, Public Works Dept.)	Regional watershed and river advocacy groups
SW 6	The town should implement water conservation measures including but not limited to conservation programs, public outreach campaigns, a comprehensive water usage and loss budget, and a leak detection program.	Public Works Dept. Town Manager (Town Planner)	Consulting services NH DES
WE 1	Evaluate the extent and distribution of invasive species of plants, insects and animals in town including but not limited to Phragmites, Pepperweed, Japanese Knotweed, Purple Loosestrife, and Japanese Shore Crab.	Conservation Commission	NH DES and Coastal Program
WE 2	Continue educational and outreach efforts to increase awareness of the public and others about the negative effects of invasive species.	Conservation Commission	NH DES and Coastal Program

APPENDIX B List of General Soil Map Units and Farmland Soil Map Units

General Soil Map Units

ID	Soil Name	Acres
NH010	HOLLIS-CANTON-CHATFIELD (NH010)	873.9
NH009	HOOSIC-CANTON-CHATFIELD (NH009)	4,972.2
NH016	IPSWICH-WESTBROOK-UDIPSAMMENTS (NH016)	2,722.1
NHW	Not named	334.0
Total		***8,902.3***

Farmland Soil Map Units

Soil Name	Acres
CHATFIELD-HOLLIS-CANTON COMPLEX, 3 TO 8 PERCENT SLOPES, VERY STONY	10.2
IPSWICH MUCKY PEAT	52.5
PAWCATUCK MUCKY PEAT	14.96
UDORTHENTS, SMOOTHED	6.1
UDORTHENTS, SMOOTHED	57.2
URBAN LAND	51.3
URBAN LAND-CANTON COMPLEX, 3 TO 15 PERCENT SLOPES	18.5
URBAN LAND-HOOSIC COMPLEX, 3 TO 15 PERCENT SLOPES	147.6
Total	***358.4***

APPENDIX C Natural Heritage Bureau Report (June 2009)

Source: New Hampshire Natural Heritage Bureau
Rare Species and Exemplary Natural Communities
Town of Hampton, New Hampshire

Flag	Species or Community Name	Listed Status		# Locations Reported in last 20 years	
		Fed	State	Town	State
Natural Communities - Terrestrial					
*	Beach grass grassland	--	--	2	4
Natural Communities – Estuarine					
**	Brackish marsh	--	--	1	13
***	High salt marsh	--	--	1	14
***	Low salt marsh	--	--	1	6
***	Saline/brackish intertidal flat	--	--	1	6
***	Saline/brackish subtidal channel/bay bottom	--	--	1	6
***	Tidal creek bottom	--	--	1	6
Plants					
	Arethusa (Arethusa bulbosa)	--	T	historical	21
**	Beach Grass (Ammophila breviligulata)	--	T	3	10
	Bluntleaf Pondweed (Potamogeton obtusifolius)	--	T	historical	4
	Climbing Hempweed (Mikania scandens)	--	T	historical	10
	Cross Polygala (Polygala cruciata var. aquilonia)	--	E	historical	3
**	Dwarf Glasswort (Salicornia bigelovii)	--	E	1	7
	Engelmann's Quillwort (Isoetes engelmannii)	--	E	historical	15
	Fringed Gentian (Gentianopsis crinita)	--	T	historical	25
	Nuttall's Reedgrass (Calamagrostis cinnoides)	--	E	historical	6
	Prolific Knotweed (Polygonum prolificum)	--	E	historical	9
	Robust Knotweed (Persicaria robustior)	--	E	1	6
**	Salt-marsh Gerardia (Agalinis maritima)	--	T	2	10
**	Sand Dropseed (Sporobolus cryptandrus)	--	T	1	4
**	Seaside Mallow (Hibiscus moscheutos)	--	E	historical	2
	Slender Blue Flag (Iris prismatica)	--	T	historical	10
	Small Spike-rush (Eleocharis parvula)	--	T	historical	20
	Star Duckweed (Lemna trisulca)	--	E	3	5
**	Tall Wormwood (Artemisia campestris ssp. caudata)	--	T	historical	4
	Woody Glasswort (Sarcocornia perennis)	--	E	historical	4
	Vertebrates – Birds				
*	Arctic Tern (Sterna paradisaea)	--	SC	1	2
*	Common Tern (Sterna hirundo)	--	T	1	9
	Great Blue Heron (Rookery) (Ardea herodias)	--	--	historical	38
**	Horned Lark (Eremophila alpestris)	--	SC	2	4
**	Osprey (Pandion haliaetus)	--	SC	1	76
**	Piping Plover (Charadrius melodus)	T	E	1	1
**	Saltmarsh Sharp-tailed Sparrow (Ammodramus caudacutus)	--	SC	2	8

	Seaside Sparrow (Ammodramus maritimus)	--	SC	historical	1
**	Willet (Catoptrophorus semipalmatus)	--	SC	3	5
Vertebrates – Fish					
	Banded Sunfish (Enneacanthus obesus)	--	SC	historical	29
Invertebrates – Insects					
	A Noctuid Moth (Anepia capsularis)	--	--	historical	1
	A Noctuid Moth (Euxoa pleuritica)	--	--	historical	3
	A Noctuid Moth (Idia diminuendis)	--	--	historical	4
	A Noctuid Moth (Lemmeria digitalis)	--	--	historical	1
	New Jersey Tea Span Worm (Apodrepanulatrix liberaria)	--	--	historical	2
	Pink Sallow (Psectraglaea carnosa)	--	--	historical	4

Listed Codes
E = Endangered T – Threatened
SC = Species of Special Concern, a label used by NH Fish & Game to identify species that are not Threatened or Endangered but are in need of conservation.

Flags **** = Highest Importance
*** = Extremely High Importance
** = Very High Importance
* = High Importance

These flags are based on a combination of (1) how rare the species or community is and (2) how large or healthy its examples are in that town. Please contact Natural Heritage Inventory at (603) 271-3623 to learn more about this or alternative ways of setting priorities.

APPENDIX D Conserved Lands

Property Name	Acres	Protection Type
"Twelve Shares Wall"	2.6	FO
ASNH H. Falls Saltmarsh - Cram, et al.	0.5	FO
ASNH H. Falls Saltmarsh - Cram, et al.	0.2	FO
ASNH Hampton Falls Saltmarsh - Swain	4.2	FO
ASNH Hampton Saltmarsh - SPNHF	9.0	FO
ASNH Hampton Saltmarsh - SPNHF	5.3	FO
ASNH Hampton Saltmarsh - SPNHF	0.2	FO
ASNH Hampton Saltmarsh - SPNHF	2.1	FO
Bashby Road	7.3	FO
Batchelder Park	32.4	FO
Battcock	1.4	CE
Battcock	5.0	CE
Battcock	5.5	CE
Birch Rd. Marsh	5.4	FO
Chase Lot	0.0	CE
F&G Hampton Saltmarsh - Brown	3.2	FO
F&G Hampton Saltmarsh - Brown	4.8	FO
F&G Hampton Saltmarsh - Brown	2.5	FO
F&G Hampton Saltmarsh - Chesterman	3.8	FO
F&G Hampton Saltmarsh - Emery	2.8	FO
F&G Hampton Saltmarsh - Garland	1.3	FO
F&G Hampton Saltmarsh - Garland	0.5	FO
F&G Hampton Saltmarsh - Greenman	1.9	FO
F&G Hampton Saltmarsh - H. Batchelder	3.9	FO
F&G Hampton Saltmarsh - Lamb	0.2	FO
F&G Hampton Saltmarsh - Lane	9.8	FO
F&G Hampton Saltmarsh - Munsey	10.8	FO
F&G Hampton Saltmarsh - Palmer	1.4	FO
F&G Hampton Saltmarsh - Perkins	1.3	FO
F&G Hampton Saltmarsh - Smart	4.2	FO
F&G Hampton Saltmarsh - Smith	2.8	FO
F&G Hampton Saltmarsh - SPNHF	23.7	FO
F&G Hampton Saltmarsh - Towle	0.3	FO
Former Barge Facility Land	6.5	FO
Giles Swamp	1.8	FO
Hampton Beach State Park	103.4	FO
Hampton Beach State Park	65.0	FO
Hampton Beach State Park	54.4	FO

Hampton Water Works Land	40.0	FO
Hampton Water Works Land	11.3	FO
Landing Road Marsh	10.5	FO
Marsh Island Corp.	0.6	CE
Marsh Island Corp.	11.0	CE
Perkins	29.2	FO
SPNHF Saltmarsh - Lamprey	7.9	FO
SPNHF Saltmarsh - Langley + Pierson	2.2	FO
SPNHF Saltmarsh - Langley + Pierson	0.1	FO
SPNHF Saltmarsh - Langley + Pierson	4.2	FO
SPNHF Saltmarsh - Leavitt	1.7	FO
SPNHF Saltmarsh - Penniman	1.2	FO
SPNHF Saltmarsh - Penniman	0.5	FO
SPNHF Saltmarsh - Penniman	1.9	FO
SPNHF Saltmarsh - Penniman	1.3	FO
SPNHF Saltmarsh - Penniman	9.7	FO
SPNHF Saltmarsh - Penniman	7.8	FO
SPNHF Saltmarsh - Penniman	1.3	FO
SPNHF Saltmarsh - Rawding	0.8	FO
SPNHF Saltmarsh - Rawding	1.0	FO
SPNHF Saltmarsh - Smith	4.1	FO
Town of Hampton Land	18.3	FO
Town of Hampton Land	5.4	FO
Town of Hampton Land	4.8	FO
Town of Hampton Marsh	0.8	FO
Town of Hampton Marsh - Cogger + Palmer	1.5	FO
Town of Hampton Marsh - D.F. Batchelder	6.8	FO
Town of Hampton Marsh - D.F. Batchelder	5.5	FO
Town of Hampton Marsh - Elkins, et al.	5.0	FO
Town of Hampton Marsh - Ellison	4.7	FO
Town of Hampton Marsh - Garland	1.4	FO
Town of Hampton Marsh - Gooch	2.0	FO
Town of Hampton Marsh - Hickman	6.4	FO
Town of Hampton Marsh - J.F. Batchelder	7.0	FO
Town of Hampton Marsh - Knight	5.5	FO
Town of Hampton Marsh - Mott	10.9	FO
Town of Hampton Marsh - Ocean Blvd.	0.2	FO
Town of Hampton Marsh - Ocean Blvd.	1.4	FO
Town of Hampton Marsh - Page	3.0	FO
Total	***630.3***	--

FO = Full Ownership (71) CE = Conservation Easement (6)

APPENDIX E Groundwater Resources and Statistics for Hampton

Mean annual domestic per capita water-demand coefficients, estimated domestic demand, and domestic withdrawal in 2003.

Population			Domestic Water Use (millions of gal/day)	
Total	Self-supplied	% Self-supplied	Demand (public and self-supply)	Withdrawal (self –supply only)
14,937	1,652	11	1.363	0.128 (128,000 gal/day)

Mean annual summer, and winter domestic per capita water-demand and consumptive use in 2003.

		Percent Consumptive Use	
Population	Annual water demand (mgal/day)	Annual	Summer
14,937	1.363	16	29

Estimated domestic water demand, return, and sewer flow and consumptive use in 2003.

Population			Domestic Water use (millions gal/day)			
Total	Septic	Percent on Septic	Total Demand	Return Flow	Sewer Flow	Consumptive use
14,937	2,081	14	1.363	0.130 (130,00 gal/day)	1.01	0.223 (223,000 gal/day)

Community Water Systems

Resource	Withdrawal rate (mil gal/day)	PWSID	DES ID	Water System	Population Served
Exeter River	.386 (386,000 gal/day)	NH0801010	20099	Exeter Water Works	58

Summary of water demand, withdrawal, and return flow by sector.

Domestic			Commercial			Industrial			Nursery/Crop Irrigation		
Demand	Withdrawal	Return Flow	Demand	Withdrawal	Return Flow	Demand	Withdrawal	Return Flow	Demand	Withdrawal	Return Flow
1.363	0.128	0.130	0.250	0.003	0.004	0.027	0.000	0.000	0.001	0.001	0.000

CWWS Withdrawal	CWWS Return flow
1.063	2.816

TOTAL ALL SECTORS		
Demand	Withdrawal	Return Flow
1.641	1.194	2.950

Projected domestic water demand for 2017 and 2025.

Domestic Water Demand (mil gal/day)			Growth (%)	
2003	2017	2025	2003-2017	2003-2025
1.363	1.313	1.400	9	17

Imports and Exports of Freshwater and Wastewater for Hampton North Hampton, Rye and Stratham

Town	Freshwater				Wastewater			
	Imported	From	Exported	To	Imported	From	Exported	To
Hampton	4,000 gal/day	Exeter	96,000 gal/day	Rye	86,000 gal/day	Rye		
North Hampton	--	--	415,000 gal/day	Hampton	--	--	--	--
Rye	96,000 gal/day	Hampton		--	--	--	86,000 gal day	Hampton
Stratham	--	--	233,000 gal .day	Hampton	--	--	--	--

Source:
Horn, M.A., Moore, R.B., Hayes, Laura, Flanagan, S.M., 2008, Methods for and Estimates of 2003 and Projected Water Use in the Seacoast Region, Southeastern New Hampshire: U.S. Geological Survey Scientific Investigations Report 2007–5157, 87 p., plus 2 appendixes on CD-ROM]

APPENDIX F Additional References

Historic Information

The Lane Memorial Library in Hampton has compiled a list of historic documents on their website titled "Geography and Natural Resources of Hampton, New Hampshire". Refer to these documents at http://www.hampton.lib.nh.us/hampton/history/geography/index.htm.

APPENDIX G Map Set

Map 1. Base Map
Map 2. General Soils, and Soil Potential and Suitability for Development
Map 3 Agricultural Soils
Map 4. Surface Water Resources
Map 5. Surface Waters Under the Comprehensive Shoreland Protection Act
Map 6. Groundwater Resources
Map 7. New Hampshire's Wildlife Action Plan
Map 8. The Land Conservation Plan for New Hampshire's Coastal Watersheds
Map 9. Open Space and Unfragmented Lands
Map 10. Color Orthophotograph

Natural Resources Inventory

Town of Hampton, NH

June 2009

Map 1 - Base Map

Hampton Tax Parcels

Digital Tax Parcel information for the Town of Hampton was obtained from the Town of Hampton Assessing Department, February 2004.

2008 Aerial Photo Data

Fugro EarthData Inc. collected airborne digital photography and airborne GPS data to support the photogrammetric mapping of the City of Boston and surrounding urban areas. The project site was flown on the dates of April 10th, 16th, 17th and 18th of 2008 at an elevation of 9490' . The data was collected with the use of a Cessna Conquest, tail # N441S, equipped with a Leica ADS40/52 camera system, including an inertial measuring unit (IMU) and a dual frequency GPS receiver to support the generation of ground ortho-photographs with a 0.30 meter ground sample distance (GSD) or 6.9' horizontal accuracy. The tiles are 1500m x 1500m and projected in UTM NAD83 Meters zone 19N.

Base Features (transportation, political and hydrographic) were automated from the USGS Digital Line Graph data, 1:24,000, as archived in the GRANIT database at Complex Systems Research Center, Institute for the study of Earth, Oceans and Space, University of New Hampshire, Durham, NH; 1992-1999. The roads within the Rockingham Planning Region have been updated by Rockingham Planning Commission and by NH Department of Transportation through ongoing efforts.

NOTE: Base features for areas surrounding the Rockingham Region may be shown on this map. These features were automated from USGS 1:100,000 scale digital data sources. This information was provided for reference only. RPC makes no claim to its completeness or accuracy.

ROCKINGHAM PLANNING COMMISSION

NH GRANIT

N

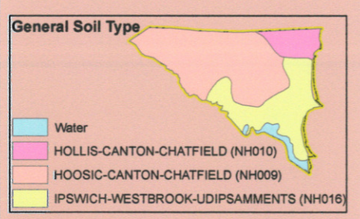
0 0.125 0.25 0.5 0.75 Miles

Natural Resources Inventory

Town of Hampton, NH

June 2009

Map 2 - Soil Potential and Suitability for Development



Soil Potential Rating

- High
- Low
- Medium
- No Rating
- Very High
- Very Low
- n/a

Roads

- State
- Local
- Private
- Not Maintained
- Waterbody
- River/Stream
- Hampton Town Bound

Hydric Soils

- Very Poorly Drained Soils
- Poorly Drained Soils

Soil Ratings for Development indicate the relative quality of a soil for development when compared to other soils in the same county survey. Suitability of a soil as it pertains to septic tank absorption fields, dwellings with basements, and local roads and streets were used as the basis for determining the potential of a soil for development. A composite rating was given to each soil type combining the rating for each of the three uses stated above. The ratings are given as one of the following: Very High, High, Medium, Low and Very Low. Some soil ratings were NA (Not Available) or were Not Rated, and were not used in this product. For further information regarding Soil Potential Ratings for Low Density Development, contact your County Conservation District.

This information was produced by the Rockingham County Conservation District and was distributed in the publication: Soil Potential Ratings for Low Density Development, Rockingham County, New Hampshire, published in May 1987.

Soil boundaries are from NRCS county soil surveys, published at varying scales. All other features are from USGS 1:24,000 scale Digital Line Graphs. All features distributed by Complex Systems Research Center, Durham, NH. Soil unit boundaries that coincide with water body boundaries in the field will not always coincide on this map, due to their differing data sources.

Base Features (transportation, political and hydrographic) were automated from the USGS Digital Line Graph data, 1:24,000, as archived in the GRANIT database at Complex Systems Research Center, Institute for the study of Earth, Oceans and Space, University of New Hampshire, Durham, NH; 1992-1999. The roads within the Rockingham Planning Region have been updated by Rockingham Planning Commission and by NH Department of Transportation through ongoing efforts.

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ROCKINGHAM PLANNING COMMISSION

NH GRANIT

0 0.125 0.25 0.5 0.75 Miles

Soil Potential	Acres
Very High	473.4
High	1125.2
Medium	2135.4
Low	238.7
Very Low	3187.5
n/a	105.1
No Rating	1211.5
Grand Total	8476.9

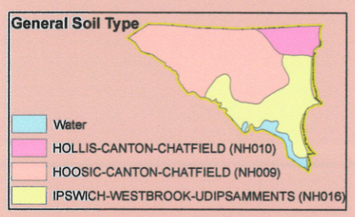
Hydric Soil Type	Acres
Very Poorly Drained	2716.5
Poorly Drained Soil	1400.3
Water	129.2
Grand Total	**4246.0**

Natural Resources Inventory

Town of Hampton, NH

June 2009

Map 3 - Agricultural Soils



Prime Farmland
Farm Soils Statewide Importance
Farmland of local importance
Waterbody
River/Stream

Roads
State
Local
Private
Not Maintained
Hampton Town Boundary

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, forest land, or other land, but not urban built up land or water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods.

In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding.

Farmland of Statewide Importance

This is land, in addition to prime and unique farmlands, that is of statewide importance for the production of food, feed, fiber, forage and oilseed crops. Criteria for defining and delineating this land are to be determined by the appropriate State agency or agencies. Generally, additional farmlands of statewide importance include those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce as high a yield as prime farmlands if conditions are favorable. In some States, additional farmlands of statewide importance may include tracts of land that may have been designated for agriculture by state law.

Soil boundaries are from NRCS county soil surveys, published at varying scales. All other features are from USGS 1:24,000 scale Digital Line Graphs. All features distributed by Complex Systems Research Center, Durham, NH. Soil unit boundaries that coincide with water body boundaries in the field will not always coincide on this map, due to their differing data sources.

Base Features (transportation, political and hydrographic) were automated from the USGS Digital Line Graph data, 1:24,000, as archived in the GRANIT database at Complex Systems Research Center, Institute for the study of Earth, Oceans and Space, University of New Hampshire, Durham, NH; 1992-1999. The roads within the Rockingham Planning Region have been updated by Rockingham Planning Commission and by NH Department of Transportation through ongoing efforts.

NOTE: Base features for areas surrounding the Rockingham Region may be shown on this map. These features were automated from USGS 1:100,000 scale digital data sources. This information was provided for reference only. RPC makes no claim to its completeness or accuracy.

ROCKINGHAM PLANNING COMMISSION

NH GRANIT

0 0.125 0.25 0.5 0.75 Miles

Type	Acres
All areas are prime farmland	538.8
Farmland of local importance	1086.7
Farmland of statewide importance	1293.5
Total	**2919.0**

Natural Resources Inventory

Town of Hampton, NH

June 2009

Map 4- Surface Water Resources

National Wetlands Inventory
- Emergent
- Estuarine
- Forested
- Lacustrine
- Marine
- Pal-UnconS
- Scrub-Shru
- Prime Wetlands

Watershed (HUC 10)
- Coastal Drainage
- Great Bay Drainage

Roads
- State
- Local
- Private
- Not Maintained
- Waterbody
- River/Stream
- Hampton Town Boundary

These shapefiles represent all wetlands in Hampton and Hampton Falls as mapped by Gove Environmental Services Inc. in two separate phases. Phase I mapping was associated with the Taylor River and was mapped in October 2004. Phase II encompassed the remainder of Hampton and Hampton Falls and was completed in November of 2005.

The source is wetland lines hand drawn on 2003 Emerge Color Infrared photos and then Digitized, cleaned and Converted to ArcView Shapefiles by Jeff Cantara, GIS Coordinator and Wildlife Ecologist at Gove Environmental Services, Inc. in Stratham, NH. (603) 778-0644 x 18

The US Fish and Wildlife Service National Wetlands Inventory (NWI) is an ongoing effort to map and inventory the wetland areas within the United States. National Wetlands Inventory wetlands were automated by the US Fish and Wildlife Service, National Wetlands Inventory, and were distributed by GRANIT, Complex Systems Research Center. Map source scale 1:24,000. For more information see the National Wetlands Inventory website: http://www.nwi.fws.gov

Wetlands shown on this map are derived from soils classified as "very poorly drained" and "poorly drained" by the USDA Natural Resources Conservation Service. Soil boundaries are from NRCS Rockingham County Soil Survey, published at 1:20,000 scale. Soil unit boundaries that coincide with water body boundaries in the field will not always coincide on this map, due to their differing data sources and scales. Information shown on this map is for planning purposes only. Data automation completed by Complex Systems Research Center, UNH; October 1999. Soils delineation based on field work, conducted by the USDA Natural Resource Conservation Service, completed in 1985.

Watersheds were delineated and automated by the New Hampshire Department of Environmental Services, Water Resources Division. Source maps for this data layer are USGS 1:24,000 Topographic Quadrangle maps and USDA Natural Resources Conservation Service 1:250,000 watershed maps.

Base Features (transportation, political and hydrographic) were automated from the USGS Digital Line Graph data, 1:24,000, as archived in the GRANIT database at Complex Systems Research Center, Institute for the study of Earth, Oceans and Space, University of New Hampshire, Durham, NH; 1992-1999. The roads within the Rockingham Planning Region have been updated by Rockingham Planning Commission and by NH Department of Transportation through ongoing efforts.

NOTE: Base features for areas surrounding the Rockingham Region may be shown on this map. These features were automated from USGS 1:100,000 scale digital data sources. This information was provided for reference only. RPC makes no claim to its completeness or accuracy.

ROCKINGHAM PLANNING COMMISSION

NH GRANIT

0 0.125 0.25 0.5 0.75 Miles

Wetland Type	Acres
Emergent	98.9
Estuarine	2023.2
Forested	798.3
Lacustrine	26.2
Marine	217.7
Pal-UnconS	39.3
Scrub-Shru	189.9
Grand Total	**3393.4**

Prime Wetland Complex	Acres
Drakes River/Coffin Pond Complex	45.1
Hampton Falls Salt Marsh	1.5
Hampton Salt Marsh	1743.0
Lamprey Pond Complex	111.0
Line Swamp Complex	131.1
Little River Complex	48.4
Meadow Pond Complex	187.4
Old Millpond Complex	69.0
Old River Complex	157.4
Other	600.1
Smith Colony Complex	65.9
Taylor River Complex (Central)	1.4
Taylor River Complex (East)	325.5
Total	**3487**

Watershed Name HUC 10	Acres
Coastal Drainage	8342.5
Great Bay Drainage	558.2

Natural Resources Inventory

Town of Hampton, NH

June 2009

Map 5- Comprehensive Shoreland Protection Act

stream

Stream Order

1
2
3
4
5
6

Roads

State
Local
Private
Not Maintained
Hampton Town Boundary
Waterbody
River/Stream

50' Primary Building Setback and Waterfront Buffer
150' Natural Woodland Buffer
250' Protected Shoreland

For Planning Purposes Only

While every effort has been made to verify all data on this map, there may be data errors.

This map is for planning and guidance purposes only. Any questions about the CSPA should be brought to the attention of NH DES. Please visit the NH DES CSPA website http://des.nh.gov/organization/divisions/water/wetlands/cspa/

Data on this map was verified to: Consolidated List of Water Bodies Covered by the CSPA

The Comprehensive Shoreland Protection Act (CSPA), is applicable to all streams of order 4 or greater and all ponds or lakes greater than 10 acres.

Stream order is determined by using the New Hampshire hydrography dataset created and maintained by GRANIT. This map is showing only some of the required setbacks, this map should be used as a planning reference only, this map is not a official map of the CSPA and shall not be used as such.

25' (not shown) setback: this is a no fertilizer area. This prohibits the use of any fertilizer, except limestone. 483-B:9,II,d

50' setback: Primary structures are not allowed in the 50' setback. 483-B:9,II,b.

75' (not shown) setback: Septic system setback for all soil conditions, except those with restrictive soils within 18" of the surface or the soil is porous sand and gravel. 483-B:9,V,b,2A,III

100' (not shown) setback: Septic system where there are restrictive soils within 18" of the surface. 483-B:9,V,(b),2A,II

125' (not shown) setback: Septic system located in soils where the percolation rate is faster or equal to 2 minutes per inch. 483-B:9,V,(b),2A,I

150' setback: Natural woodland buffer shall be maintained within this buffer 483-B:9,V,(a),(1)

250' Line: This is the extent of the protected shoreland under the CSPA

Base Features (transportation, political and hydrographic) were automated from the USGS Digital Line Graph data, 1:24,000, as archived in the GRANIT database at Complex Systems Research Center, Institute for the study of Earth, Oceans and Space, University of New Hampshire, Durham, NH; 1992-1999. The roads within the Rockingham Planning Region have been updated by Rockingham Planning Commission and by NH Department of Transportation through ongoing efforts.

NOTE: Base features for areas surrounding the Rockingham Region may be shown on this map. These features were automated from USGS 1:100,000 scale digital data sources. This information was provided for reference only. RPC makes no claim to its completeness or accuracy.

ROCKINGHAM PLANNING COMMISSION

NH GRANIT

0 0.125 0.25 0.5 0.75 Miles

Stream Order	Miles
1	38.8
2	7.1
3	1.2
4	0.8
Grand Total	47.9

Natural Resources Inventory

Town of Hampton, NH

June 2009

Map 6- Groundwater Resources

- Public Supply Wells (active)
- Conservation Land
- Drinking Water Protection Area

Stratified-Drift Aquifers

RANGE

- Less than 1000
- 1000 to 2000
- 2000 to 4000
- greater than 4000

Roads

- State
- Local
- Private
- Not Maintained
- Hampton Town Boundary
- Waterbody
- River/Stream

Stratified-Drift Aquifer data was automated by Complex Systems Research Center, UNH and is archived in the GRANIT Database. The aquifer data was automated from maps generated as part of a larger study of groundwater resources in New Hampshire. The Study was conducted under a cooperative agreement between the US Geological Survey and the NH Department of Environmental Services, Water Resources Division. It included an assessment of the aquifers within stratified sand and gravel deposits.

Transmissivity of Stratified Drift Aquifers quantifies the ability of an aquifer to transmit water, measured in feet squared per day. Transmissivity/Aquifer data was automated by Complex Systems Research Center, UNH and is archived in the GRANIT Database. The aquifer data was automated from maps generated as part of a larger study of groundwater resources in New Hampshire. The Study was conducted under a cooperative agreement between the US Geological Survey and the NH Department of Environmental Services, Water Resources Division. It included an assessment of the aquifers within stratified sand and gravel deposits.

SOURCE WATER PROTECTION AREAS

Contents: Drinking Water Source Protection Areas which are being delineated as part of the State's drinking water protection program under the Groundwater Protection Act, RSA 485-C.

Under the State's program, a protection area is the area from which water is likely to flow toward and reach a water supply source. These areas are used by the Department in setting priorities for protection activities. The Department uses a 500-foot radius circle for protection activities associated with sources for transient systems.

The data are limited to sources for community and non-community, non-transient public water systems.

Source: NHDES, Water Supply Engineering Bureau.
Status: Complete, development is ongoing.
Last updated: March 9, 2002.

Base Features (transportation, political and hydrographic) were automated from the USGS Digital Line Graph data, 1:24,000, as archived in the GRANIT database at Complex Systems Research Center, Institute for the study of Earth, Oceans and Space, University of New Hampshire, Durham, NH; 1992-1999. The roads within the Rockingham Planning Region have been updated by Rockingham Planning Commission and by NH Department of Transportation through ongoing efforts.

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ROCKINGHAM PLANNING COMMISSION

NH GRANIT

0 0.125 0.25 0.5 0.75 Miles

Public Wells			
Name	Address	Type	Depth
AQUARION WATER CO OF NH	MILL RD	GPW	60
AQUARION WATER CO OF NH	MILL RD	BRW	456
AQUARION WATER CO OF NH	MILL RD	BRW	435
AQUARION WATER CO OF NH	MILL RD	GPW	0
AQUARION WATER CO OF NH	MILL RD	BRW	565
AQUARION WATER CO OF NH	MILL RD	BRW	308
AQUARION WATER CO OF NH	MILL RD	GPW	0
AQUARION WATER CO OF NH	MILL RD	GPW	0
AQUARION WATER CO OF NH	MILL RD	GPW	31
AQUARION WATER CO OF NH	MILL RD	GPW	0
AQUARION WATER CO OF NH	MILL RD	GPW	12
AQUARION WATER CO OF NH	MILL RD	BRW	607
AQUARION WATER CO OF NH	MILL RD	BRW	647
AQUARION WATER CO OF NH	MILL RD	GPW	0
AQUARION WATER CO OF NH	MILL RD	GPW	0
AQUARION WATER CO OF NH	MILL RD	GPW	0
AQUARION WATER CO OF NH	MILL RD	GPW	0
EMPLOYEE BENEFIT PLAN ADMN	263 DRAKESIDE RD	BRW	125
FOSS MANUFACTURING COMPANY	380 LAFAYETTE RD	BRW	500
FOSS MANUFACTURING COMPANY	380 LAFAYETTE RD		0
FOSS MANUFACTURING COMPANY	380 LAFAYETTE RD		0
FOUR SEASONS MOBILE HOME PARK	MARY BATCHELDER RD	BRW	350
FOUR SEASONS MOBILE HOME PARK	MARY BATCHELDER RD	BRW	125
HEMLOCK HAVEN	HAVEN RD	BRW	800
HEMLOCK HAVEN	HAVEN RD	BRW	550
JERRYS RESTAURANT		BRW	122
STATE LIQUOR STORE #73	INTERSTATE 95 SOUTH	BRW	250
TAYLOR RIVER ESTATES	TOWLE FARM RD	BRW	220
TAYLOR RIVER ESTATES	TOWLE FARM RD	BRW	180
TIDEWATER CAMPGROUND/SITE 35	160 LAFAYETTE RD	DUG	15
TIDEWATER CAMPGROUND/SITE 71	160 LAFAYETTE RD	BRW	210
TIDEWATER CAMPGROUND/SITE 71	160 LAFAYETTE RD	BRW	230

Natural Resources Inventory

Town of Hampton, NH

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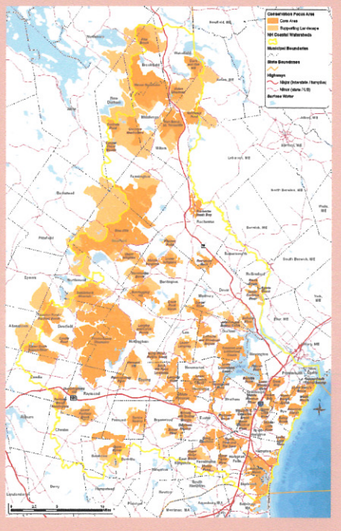
Map 7 - Land Conservation Plan for NH Coastal Watershed

Conservation Focus Areas

- Core
- Landscape
- Conservation Land
- Waterbody
- River/Stream

Roads

- State
- Local
- Private
- Not Maintained
- Hampton Town Boundary



Coastal Conservation Plan Focus Areas

Each Conservation Focus Area is comprised of a Core Area that contains the essential natural resources for which the focus area was identified, with the boundary fitted to the real world of roads, forest edges, rivers and wetlands. Some Conservation Focus Areas also include a Supporting Natural Landscape, which is comprised of natural lands that buffer and sometimes link core areas and help to maintain habitat and ecological processes.

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ROCKINGHAM PLANNING COMMISSION

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N

0 0.125 0.25 0.5 0.75 Miles

Focus Areas in Hampton

TYPE	NAME	Acres
Core	Lower Little River	2.9
Core	Taylor River and The Cove	498.8
Core	Hampton Marsh	2312.2
		2,814.0

Natural Resources Inventory

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Map 8 - New Hampshire's Wildlife Action Plan

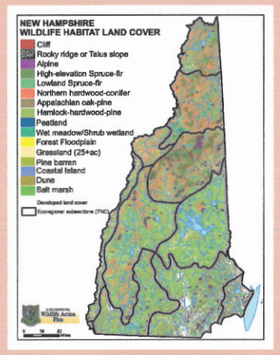
Wildlife Action Plan Tiers

Tiers

- Highest ranked habitat in NH (by condition)
- Highest ranked habitat in biological region
- Supporting landscapes
- Wildlife Action Plan Focus Areas
- Conservation Land
- Waterbody
- River/Stream

Roads

- State
- Local
- Private
- Not Maintained
- Hampton Town Boundary



Wildlife Action Plan Priority Areas for Protection

Setting habitat protection priorities depends on many factors. First are biological factors based on the relative conservation value of the habitat. For example, a property with a nest of an endangered bird may be an immediate conservation priority because the property has statewide significance for the continued occurrence of that species. The other set of factors are sociologically based such as developmental threats or land ownership patterns. A large unfragmented block of habitat with only a few landowners is usually easier to protect than one with many landowners. Below are some general guidelines for assisting your town with determining habitat protection priorities. The goal is to work with the different planning tools available and devise strategies to keep your significant wildlife habitat intact. When development is planned that impacts significant habitats, make an effort to minimize the impacts. For example, a new subdivision, that would encroach onto an unfragmented tract of land with a rare species, could be clustered in a way that minimizes fragmentation and provides a wide buffer from the rare species habitat. With careful planning and consideration, your town's significant habitat map can look the same 10 years in the future.

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ROCKINGHAM PLANNING COMMISSION

NH GRANIT

0 0.125 0.25 0.5 0.75 Miles

WAP Tiers	Acres
Highest ranked habitat in biological region	177.5
Highest ranked habitat in NH (by condition)	1545.8
Supporting landscapes	1379
Grand Total	**3102.3**

Wildlife Action Plan Conservation Focus Areas																			
ACRES	Tier1acres	Tier2acres	Tier3acres	Dunes	Saltmarsh	Coastalisl	Peatlands	MarshShrub	Cliff	RidgeTalus	Alpine	FloodFor	PitchPine	Grassland	APPOAKPINE	HEMHWDPINE	CONSACRES	CONSPCT
121.2	79	0	41	N	Y	N	N	N	N	N	N	N	N	N	N	N	28	23.41
27.3	14	0	12	N	Y	N	N	N	N	N	N	N	N	N	N	N	2	6.35

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Map 9 - Open Space and Unfragmented Lands

- Forested Blocks
- Unfragmented Lands (Blocks over 10 Acres)
- Conservation Land
- Waterbody
- River/Stream

Roads

- State
- Local
- Private
- Not Maintained
- Hampton Town Boundary

Acres of Conservation Acres = 630
Acres of Forested Blocks = 583.51
Acres of Unfragmented Blocks = 3636.3

UNFRAGMENTED HABITAT BLOCKS

Unfragmented habitat blocks were generated by selecting the natural landcover classes in the 2001 NH Land Cover Assessment data provided by GRANIT. (that is, all classes except 100=comm/ind/res and 140=transportation) The developed land classes and a combined buffer of NHDOT roads class I-V and USGS 1:24,000-scale class I-IV roads were considered fragmenting features. Any portion of a waterbody wider than 1/4 mile, except those completely within a single habitat block, were also considered fragmenting. Habitat blocks were then ranked based on size and area/perimeter ratio. Size thresholds were determined from a literature review of species of conservation concern in New Hampshire. Area/perimeter ratio classes are based on natural breaks in the data. Ratios provide a relative measure of the amount of interior habitat available in a given block.

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ROCKINGHAM PLANNING COMMISSION

NH GRANIT

N

0 0.125 0.25 0.5 0.75 Miles